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A TAXONOMIC STUDY

OF THE

COSMOPOLITAN SCINCOID LIZARDS

OF THE

GENUS EUMECES

WITH AN

ACCOUNT OF THE DISTRIBUTION AND RELATIONSHIPS OF ITS SPECIES

BY

EDWARD H. TAYLOR

(3)

PREFACE

In 1926, when the plan of this work was conceived, I began to assemble at the University of Kansas a collection of *Eumeces* that would serve as a working basis for such a study. These collections were accumulated slowly, since only certain summer months were available to me for collecting, and since the species are, save for one or two, extremely elusive and difficult of accession. In the summer of 1927, collections were made in Arkansas and Tennessee; in 1928, in Kansas; in 1929, in New Mexico, Arizona and California; in 1930, in Texas, New Mexico, Arizona, California, Nevada and Utah; in 1931, in Oklahoma, Texas, New Mexico and Colorado. Thus much first-hand information on habits and habitats was obtained.

In 1932, accompanied by Hobart Smith, I ventured into Mexico. Here, it was apparent, was a fairly accessible *terra incognita* that held the answer to many relationship problems and which doubtless still had undiscovered species. It was a critical region and larger series of known species were needed before the relationship of Mexican and American forms could be understood. This Mexican journey carried us into seventeen Mexican states and rewarded us with more than a hundred specimens of these skinks, certain of which represented species apparently new to science. However, the very disheartening fact remained that we had failed to obtain several rare forms long known to science, in spite of the fact that search was made in the type localities in some cases.

The summer of 1933 was spent in Eastern museums, examining and reëxamining specimens.

In 1934 I journeyed in western Mexico in the states of Sonora, Sinaloa and Nayarit. Here I met with most disheartening results as regards *Eumeces*. In the two months collecting (although more than 1,500 specimens were collected) only a single specimen of *Eumeces* was taken. Hobart Smith, in 1934, accompanied by David Dunkle, made a journey into northwestern Mexico in the states of Chihuahua, Durango, Zacatecas and Nuevo León, and while generally successful, likewise obtained only a single specimen of *Eumeces*.

Aside from the material segregated at Kansas University, I have been fortunate in having been permitted to examine preserved specimens belonging to all the larger American Museums and many of the smaller ones.

In 1928 I learned that Dr. Charles Burt had likewise in mind a study of the genus *Eumeces* and we agreed to combine our efforts. Doctor Burt, during the summers of the two succeeding years, collected data on specimens in the American Museum of Natural History and the Harvard Museum of Comparative Zoölogy. In 1931 Doctor Burt, due to press of other work and the difficulties involved in our being in separate localities, withdrew from the undertaking, but very generously made available to me his accumulated data.

Owing to the necessity of having available more detailed data than had been taken, I reëxamined the specimens at Harvard and the American Museum and in most cases checked the data taken by Doctor Burt. In cases where this was not done acknowledgment is made to Doctor Burt in the text where his data are used.

The work in its present form was completed November 28, 1934.

EDWARD HARRISON TAYLOR.

Lawrence, Kansas.

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A Taxonomic Study of the Cosmopolitan Scincoid Lizards of the Genus EUMECES

With an Account of the Distribution and Relationships of Its Species

ABSTRACT: This paper is a monographic revision of the genus *Eumeces* Wiegmann, based for the most part on the collections to be found in the United States. All species and subspecies have been redescribed and data on variation have been recorded. The measurements of a series of specimens of each form have been given. Practically all species have been figured either by line drawings or photographs. A more or less complete list of localities where specimens have been taken is given, as well as maps showing the present known distribution.

Numerous nomenclatorial changes have been made from those commonly accepted.

Compared with the "Checklist of North American Amphibians and Reptiles" Stejneger and Barbour, 3d ed., 1933, the following names are added, omitted or changed.

Eumeces laticeps (Schneider).
Eumeces incxpectatus Taylor.
Eumeces egregius egregius (Baird).
Eumeces egregius onocrepis (Cope).
Eumeces septentrionalis septentrionalis (Baird).
Eumeces septentrionalis obtusirostris (Bocourt) (formerly *Eumeces pachyurus* Cope).
Eumeces gilberti gilberti Van Denburgh.
Eumeces gilberti rubricaudatus subsp. nov.
Eumeces skiltonianus brevipes Cope.
Eumeces gaigei Taylor.
Eumeces pluvialis Cope placed in the synonymy of *Eumeces anthracinus* (Baird).

Compared with Boulenger's Catalogue of the Lizards of the British Museum, vol. III, 1887, the following changes, additions or omissions occur in forms

found outside the United States. (This Catalogue is the only complete treatment of the group.)

Eumeces latiscutatus (Hallowell).
Eumeces chinensis chinensis (Gray).
Eumeces chinensis pulcher (Duméril and Bibron).
Eumeces bellii (Gray) (placed in synonymy of *Eumeces lynxe lynxe* (Wiegmann).
Eumeces lynxe lynxe (Wiegmann).
Eumeces lynxe furcirostris (Cope).
Eumeces dugèsii Thominot.
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Eumeces colimensis Taylor.
Eumeces indubitus Taylor.
Eumeces ochoterenae Taylor.
Eumeces altamirani Dugès.
Eumeces managuae Dunn.
Eumeces taeniolatus Boulenger referred to the synonymy of *Eumeces managuae* Dunn.
Eumeces scutatus Theobald referred to *Eumeces taeniolatus* (Blyth).
Eumeces pavimentatus (Geoffroy-St. Hillaire).
Eumeces princeps (Eichwald).
Eumeces zarudnyi Nikolsky.
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Eumeces chinensis formosanus Van Denburgh referred to the synonymy of *Eumeces chinensis chinensis* (Gray).
Eumeces xanthi Günther.
Eumeces pekinensis Stejneger referred to the synonymy of *Eumeces xanthi* Günther.
Eumeces kishinouyei Stejneger.
Eumeces okadae (Stejneger).
Eumeces oshimensis Thompson.
Eumeces stimsonii Thompson.
Eumeces barbouri Van Denburgh.
Eumeces marginatus kikaigensis Van Denburgh and *Eumeces marginatus amamiensis* Van Denburgh are placed in the synonymy of *Eumeces oshimensis* Thompson.
Eumeces ishigakiensis Van Denburgh is placed in the synonymy of *Eumeces stimsoni* Thompson.

INTRODUCTION

In attempting a taxonomic revision of this puzzling genus *Eumeces*, I have had as a goal the proper definition of the genus and of its known forms; the description of new and unrecognized forms; the resurrection of species long buried in synonymies; the disentanglement of certain taxonomic knots; and in a measure the bringing about of more adequate facilities for the recognition or determination of species by means of more complete descriptions and use of more adequate illustrations.

I have also attempted to arrive at the most probable derivation and relationships of the genus and its species, and so far as my data go to plot their present known distribution.

The task involving the revision of a genus places a very considerable responsibility upon the reviewer. Particularly is there a responsibility as regards his interpretation of forms with relation to taxonomy. Shall this form be made subspecific? Shall this be recognized as a species? Shall this variety even be recognized with a name? Or, on the other hand, shall this form now recognized be relegated to oblivion in the synonymy?

"Lumping" is the lazy method of treatment and probably does more to obscure true relationships and the consequent bearing on the evolutionary history of a group than anything else a reviewer might do. Excessive zeal in "splitting" and thus multiplying named forms, rather than reducing them, may likewise defeat the desired end. The supreme difficulty is the maintenance of a consistent attitude. A question arises concerning two forms occupying adjacent territory: are they species or subspecies? With a considerable number of characters which tend to but do not definitely separate the forms, it might appear wise to regard them as subspecies. If, on the other hand, only a single specimen or a very occasional one shows a tendency to merge certain characters, it seems unwise to so regard them. When two forms are able to maintain their identity throughout a considerable area common to both, one should regard them as species despite an occasional specimen which seems to combine characters of both, for in this case it may be adaptive resemblance due to the same environment. An occasional cross between species does not necessarily imply close (subspecific) relationship. We are aware of crosses occurring between very distinct species or even genera which might show mixed characters of the two forms. One can conceive such crosses in which certain dif-

ferential specific characters are of such a nature as to behave as Mendelian characters in inheritance, and in a single brood of the second generation, one might have typical specimens of each species from a single mother.

In this work, where there seems to be doubt due to an insufficiency of material, I have usually retained forms under subspecific names, especially where their ranges are contiguous and have definitive characters of size, color or squamation which permit identification of the adult.

In some forms, notably *Eumeces obsoletus*, the specimens from north to south vary so gradually that it seems necessary to retain the variants under a single specific name. In the case of *Eumeces brevirostris, Eumeces skiltonianus* and certain others, I have placed a number of variant forms under a single name, due to too great an insufficiency of material to positively limit and define these variants as either species or subspecies. Throughout the work I have endeavored to maintain a consistent attitude, but unconsciously consistency may have been violated.

In attempting to determine relationships I have found many difficulties in the way of arriving at unassailable conclusions. No single set of criteria will suffice, and one may claim that relationships exist between certain forms because of certain scale and color pattern similarities; in another case one will feel constrained to postulate relationship in spite of great dissimilarity in color pattern and scale formula; or, in still another, to separate widely forms that agree in certain scale or color characters. Here again, perhaps, consistency has been violated.

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The drawings are of typical specimens, and are largely the work of Mr. Melvin Douglas, of Lawrence, Kan. The photographs have been made almost wholly from preserved specimens submerged under water, by L. M. Peace and Oren R. Bingham, of Lawrence, Kan.

METHODS AND MATERIALS

In this study of the genus *Eumeces,* the general method of treatment is that followed in numerous recent monographic works of a similar sort, save that space has forbidden my quoting extensively from other authors.

I have endeavored to make the synonymies complete, but I am aware that this has been done only in a measure, and that doubtless I have overlooked important papers. Owing to lack of adequate library facilities, the literature was transcribed by typing or photostating so that, save for certain rare works, the entire literature was immediately available. Unfortunately, in the literature of the *Fasciatus* group, and again in that of the *Schneiderii* group, it has not been possible to relegate, with certainty in all cases, each species reference to the proper synonymy, owing to my in-

ability to determine, at times, what species was being treated by a particular author. The descriptions have been drawn up from individual specimens in rather considerable detail. Many species have not been adequately described heretofore. It appears obvious that brevity in descriptions contributes more to taxonomic confusion than does prolixity.

In the descriptions many characters are given just as they appear; and under the topic "variation" the variation of only the more salient characters is given. It must, of course, be realized that more characters than are mentioned under this topic also vary; for instance, lamella formulae, scales about insertion of arms, etc. The color descriptions are taken largely from alcoholic specimens, since it is in this condition the specimen is most frequently studied. When the coloration is taken from living specimens, this fact is mentioned. It must be remembered that specimens preserved in formalin* are usually greatly darkened, and often the pattern is almost wholly obscured. If such specimens are placed below water, the pattern can often be more easily discerned.

Where a series is available, the measurements of several specimens are given, showing a series from young to old. It will be noted that relative body proportions change as the specimens grow older; for instance, the length of limb in proportion to the axilla to groin measurement, and the width of the head in proportion to its length.

Distribution of the forms is, for the most part, based on the locality records of specimens examined. A certain amount of published data on localities has been discarded or retained with a question, inasmuch as the exact identity of the specimens reported may be open to question.

Owing to the courtesy of the authorities of the various museums of the United States, and owners of certain private collections, it has been possible to study most of the *Eumeces* material preserved in the United States. This material has been subjected to a careful scrutiny and very detailed data taken on practically every specimen examined. Thus, for each single specimen, locality data and museum data have been recorded; ten measurements have been taken; forty-seven other items of data have been recorded, together with color data or details of markings. These aforementioned items involve a count of scales from parietals to above anus; four counts

* One should avoid preserving *Eumeces* in formalin; or, if used, the specimen should be allowed to remain in this fluid no more than twenty-four hours before the transference is made to water (for washing) and then to alcohol.

of scales round the body at various points; and when tail is complete the long series of subcaudals. This involves counting nearly 300 scales on a single specimen; and in most cases these were counted under a binocular microscope. When one considers the very large number of specimen examined, it becomes apparent that the accumulation of data is so great that it is feasible to publish but a small part of it.

Something less than one third of the species has been observed and collected by myself. A few species collected by others have been observed alive in the vivarium. This phase of the work has been in a measure neglected since in the case of only a few species has any extensive acquaintance been made with habits and life histories in the field. Data obtained appear under the various species discussed. Specimens of certain forms—*obsoletus, fasciatus* and *septentrionalis septentrionalis*—brought to my laboratory have laid eggs and the young have been hatched. Noble and Mason (1933) report on the behavior of *laticeps* and *fasciatus,* and considerable data on behavior in the field appear in the works of many authors.

ILLUSTRATIONS

The drawings, particularly as regards the appearance of the rostral on the dorsal side of the head, may appear to differ from the details given in the descriptions. This is due to the fact that the artist has attempted to draw in perspective the receding tip of the snout. The same is true of scales in the dorsolateral region of the head. It will be further noted that the drawings are considerably enlarged, and considerable effort has been made to show more or less accurately the smaller as well as the larger scales.

It will be noted from descriptions that certain changes and additions have been made in nomenclature of the scales. This has been done for the purpose of permitting more careful word pictures of the forms. The scales to which these words apply may be discerned from the section beginning on page 70 or from the figure on page 71.

The photographic illustrations have been made by photographing the preserved specimens under water. The specimens are placed on pins which are fastened to a piece of glass. This is submerged in water in a white enameled pan at some distance from the bottom, thus allowing the shadow formed to be thrown out of focus. By this method much of the light reflected from the scales is eliminated. The same results can be obtained by using a glass bottomed container for the water.

TYPE SPECIMENS

Perhaps nothing is more important to a reviewer of the taxonomy of a group than a study of the type material on which the various species have been founded, inasmuch as the written descriptions, often brief, and the figures, if any, are often inadequate to convey a correct picture of the species.

In this study, the following types have been examined:

altamirani Dugès. Alfredo Dugès Museum, Guanajuato, Mexico.
anthracinus Baird. United States National Museum.
bicolor Harlan. Academy of Natural Sciences, Philadelphia.
brevilincatus Cope. United States National Museum.
brevipes Cope. United States National Museum.
colimensis Taylor. Field Museum of Natural History.
copei Taylor. E. H. Taylor-H. Smith Collection, Kansas University.
dicei Ruthven and Gaige. Museum of Zoölogy, University of Michigan.
egregius Baird. United States National Museum.
epipleurotus Cope. United States National Museum.
? *erythrocephalus* Gilliams. Academy of Natural Sciences, Philadelphia.
? *funebrosus* Cope. United States National Museum.
furcirostris Cope. Academy of Natural Sciences, Philadelphia.
gaigei Taylor. Kansas University Museum.
guttulatus Hallowell. United States National Museum.
indubitus Taylor. E. H. Taylor-H. Smith Collection, Kansas University.
inexpectatus Taylor. Kansas University Museum.
inornatus Baird. United States National Museum.
latiscutatus Baird. United States National Museum.
latiscutatus okadae Stejneger. United States National Museum.
leptogrammus Baird. United States National Museum.
longirostris Cope. United States National Museum.
managuae Dunn. United States National Museum.
marginatus Hallowell. United States National Museum and Academy of Natural Sciences, Philadelphia (No. 9309).
multivirgatus Hallowell. Academy of Natural Sciences, Philadelphia.
obsoletus Baird. United States National Museum.
ochoterenae Taylor. E. H. Taylor-H. Smith Collection, Kansas University.
pachyurus Cope. Academy of Natural Sciences, Philadelphia.
parviauriculatus Taylor. United States National Museum.
parvulus Taylor. United States National Museum.
pekinensis Stejneger. United States National Museum.
quadrilineatus Hallowell. United States National Museum.
rovirosae Dugès. Alfredo Dugès Museum, Guanajuato, Mexico.
schmidti Dunn. Academy of Natural Sciences, Philadelphia.
septentrionalis Baird. United States National Museum.
skiltonianus Baird. United States National Museum.
sumichrasti Cope. United States National Museum.
tetragrammus Baird. United States National Museum.
tunganus Stejneger. United States National Museum.
xanthi Günther. British Museum, Natural History.

Paratypes of the following have been examined:

chinensis formosanus Van Denburgh. California Academy of Sciences.
marginatus amamiensis Van Denburgh. California Academy of Sciences.
marginatus kikaigensis Van Denburgh. California Academy of Sciences.
oshimensis Thompson. California Academy of Sciences.
stimsonii Thompson. California Academy of Sciences.

Neither types nor paratypes have been seen of the following species and subspecies:

aldrovandii Duméril and Bibron. Probably in the Museum National d'Histoire Naturelle, Paris.
amblygrammus Cope. Formerly in the United States National Museum. Now apparently lost.
americanus Harlan. Originally at the Academy of Natural Sciences, Philadelphia. Now apparently lost.
algericnsis Peters. Zoologischen Museum, Berlin.
barbouri Van Denburgh. California Academy of Sciences.
**bellii* Gray. British Museum, Natural History.
blythianus Anderson. Indian Museum.
**bocourti* Boulenger. British Museum, Natural History. Same type as *humilis*.
**brevirostris* Günther. British Museum, Natural History.
callicephalus Bocourt. Museum National d'Histoire Naturelle, Paris.
capito Bocourt. Museum National d'Histoire Naturelle, Paris.
†*cepedii* Merrem. Location of type unknown.
chinensis Gray. British Museum, Natural History.
cyprius Cuvier. Probably no existing type.
dugesii Thominot. Museum National d'Histoire Naturelle, Paris.
elegans Boulenger. British Museum, Natural History.
†*fasciatus* Linnaeus. Figure from Catesby's "Carolina."
hallowelli Bocourt. Museum National d'Histoire Naturelle, Paris.
**humilis* Boulenger. British Museum, Natural History.
japonicus Peters. Zoologischen Museum, Berlin.
lagunensis Van Denburgh. Type formerly in the California Academy of Sciences. Destroyed in the fire, 1906.
laticeps Schneider. Present location unknown.
lynxe Wiegmann. Zoologischen Museum, Berlin.
meridionalis Domergue. ? Museum of Oran.
obtusirostris Bocourt. Museum National d'Histoire Naturelle, Paris.
onocrepis Cope. Formerly in the Peabody Museum, Salem, Massachusetts. Now apparently lost.
pavimentatus Geoffroy-St. Hillaire. Present location unknown.
pluvialis Cope. Formerly in the United States National Museum. Now apparently lost.
polygrammus Cope. Formerly in the United States National Museum. Now apparently lost.
princeps Eichwald. Present location unknown. Possibly Moscow.
pulcher Duméril and Bibron. Probably Museum National d'Histoire Naturelle, Paris.

* Photographs of the types have been examined.

† Based on figures which have been examined.

quadrilineatus Blyth. Formerly in the Indian Museum. Now apparently lost.

quadrivirgatus Hallowell. Academy of Natural Sciences, Philadelphia.

quinquelineatus Linnaeus. Probably no existing type.

rufescens Shaw. Probably no existing type other than Aldrovandi's figure. Quad. Ovip., p. 660.

rufo-guttatus Cantor. British Museum, Natural History.

schneiderii Daudin. Probably Museum National d'Histoire Naturelle, Paris.

schwartzei Fischer. Naturhistorischen Museum, Hamburg.

**scutatus* Theobald. Indian Museum. Same type as *taeniolatus*.

syriaca Boettger. Senckenbergian Museum, Frankfort am Main.

**taeniolatus* Blyth. Indian Museum.

triaspis Cope. *Nomen nudum*.

tristatus Daudin. Probably Museum National d'Histoire Naturelle, Paris.

vittigerum Hallowell. Formerly in the Academy of Natural Sciences, Philadelphia. Now apparently lost.

zarudnyi Nikolski. Probably Museum of Leningrad.

CLASSIFICATION OF THE GENUS EUMECES

Class Reptilia Laurenti (1768)
‡Subclass Diapsida Osborn (1903)
Order Squamata Oppel (1811)
Suborder Sauria MacCartney (1802)
Division Autarchoglossa Wagler (1830)
Section Scincomorpha Camp (1923)
Superfamily Scincoidea Cuvier (1817)
Family Scincidae Gray (1825)
Genus Eumeces Wiegmann (1834)

GENUS *EUMECES* WIEGMANN

SYNONYMY

1758. *Lacerta* (part.) Linnaeus. Systema Naturae, 10th Ed., Vol. 1, p. 205; idem, 12th Ed., 1766, p. 359.

1824. *Scincus* (part.) Harlan. Journ. Acad. Nat. Sci., Phila., IV, pt. 2, 1824, p. 286; idem, VI, pt. 1, 1829, p. 9; and Med. Phys. Res., 1829, p. 137.

1826. *Mabuya* (part.) Fitzinger. Neu. Class. Rept., 1826, p. 23.

1830. *Euprepis* (part.) Wagler. Nat. Syst. Amph., 1830, p. 161.

1834. *Eumeces* (part.) Wiegmann. Herp. Mex., 1834, p. 36 (type *Scincus pavimentatus* = *Eumeces pavimentatus* Geoffroy [part.]); Wiegmann, Arch. für Natur., II, 2, 1835, p. 288 (type *Eumeces pavimentatus* Geoffroy-St. Hillaire); idem, III, 1, 1837, pp. 131, 132; Hallowell, Trans. Amer. Philos. Soc., New Series, 1860, p. 73 (subgenus); Peters, Mon. Ber. Akad. Wiss. Berlin, 1864, p. 48; Stoliczka, Journ. Asiatic Soc. Bengal, XLI, 1872, p. 121; Bocourt, Miss. Sci. Mexique, Liv. VI, 1879, pp. 418-422; Smith, Rep. Geol. Surv. Ohio, V, pt. 1, 1882, p. 650; Murray, Zoöl. Sind, 1884, p. 355; Boulenger, Cat. Liz. Brit. Mus., III, 1887, pp. 365-366; Hoffman, in Bronn,

* Photographs of the types have been examined.

‡ PARAPSIDA Williston; LEPIDOSAURIA Romer.

Klass. Ord. Thier-R., VI, pt. III, 1890, pp. 1148, 1149; Boulenger, Trans. Zoöl. Soc. London, XIII, 1895, p. 136; Cope, Amer. Nat., 1896, pp. 1003-1026; Herrick, Terry, Herrick, Bull. Sci. Lab. Denison Univ., XI, 1899, pp. 146-147; Stejneger, Bull. U. S. Nat. Mus., No. 58, 1906, pp. 193-195; Beddard, Proc. Zoöl. Soc. London, 1907, p. 58; Van Denburgh, Proc. Cal. Acad. Sci., 4th Ser., III, 1908-1913, pp. 211-213; Ditmars, The Reptile Book, 1919, pp. 195, 196; Schmidt, Bull. Amer. Mus. Nat. Hist., XLIX, 1919, p. 30; Camp, Bull. Amer. Mus. Nat. Hist., XLVIII, 1923, p. 33; Stejneger, Proc. U. S. Nat. Mus., LXVI, 1926, pp. 44, 45; Sun, Cont. Biol. Lab. Sci. Soc. China, II, 1926, p. 2.

1839. *Plestiodon* Duméril and Bibron. Erp. Gén., V, 1839, p. 697, (subgenus); Gray, Cat. Spec. Liz. Coll. Brit. Mus., 1845, p. 90 (genus); Hallowell, Trans. Amer. Phil. Soc., 1860, XI, p. 81 (subgenus); Brown, Proc. Acad. Nat. Sci. Phila., 1857, p. 215; Hoffman, in Bronn, Klass. Ord. Thier-R., VI, pt. III, 1890, p. 1148; Brown, Proc. Acad. Nat. Sci. Phila., 1908, pp. 118, 119; Van Denburgh, Occas. Papers Cal. Acad. Sci., X, No. 1, 1922, p. 577; Pratt, Vert. Anim. Amer., 1923, p. 205.

1843. *Pleistodon* Fitzinger. Syst. Rept., 1843, p. 22 (emendation; type *Pleistodon quinquelineatum*).

1843. *Pariocela* Fitzinger. Syst. Rept., 1843, p. 22 (type *Pleistodon laticeps*).

1848. *Plistodon* Agassiz. Nomencl. Zoöl. Ind. Univ., 1848, p. 863 (emendation); Cope, Second and Third Ann. Rep. Peabody Acad., 1871, p. 82.

1852. *Lamprosaurus* Hallowell. Proc. Acad. Nat. Sci. Phila., 1852, p. 206 (type *Lamprosaurus guttulatus*).

1854. *Eurylepis* Blyth. Journ. Asiatic Soc. Bengal, XXIII, p. 739 (type *Eurylepis taeniolatus*).

1864. *Mabouia* Günther. Rept. Brit. India, 1864, p. 82; idem, Proc. Zoöl. Soc. London, 1861, p. 316.

1887. *Platypholis* (non Boulenger) Dugès. La Naturaleza, 2d Ser., I, 1887, p. 486 (type *Eumeces altamirani* Dugès).

History. The generic name *Eumeces* (from εὐμήκης, elongated) was proposed by Wiegmann in his Herpetologia Mexicana (1834, p. 36). Three species were included: *Scincus pavimentatus* Geoffroy; *Scincus rufescens* Merrem; and *Scincus punctatus* Schneider. He defined the group as follows:

"*Scutella verticalia tria; frontalia tria; dentes primores* 7, *maxillares utrinque* 20/25; *nares in medio scutello sitae* (*scutellis duobus in unum coalitis*); *squamae dorsi laeves.*"

This was divided into two groups:

"A. *Palpebra superior mediocris; inferior scutellato-squamosa; dentes palatini numerosi.* SCINCUS PAVIMENTATUS *Geoff.;* SCINCUS RUFESCENS *Merr.*

"B. *Palpebra superior brevis, inferior perspicillata:* SCINCUS PUNCTATUS *Schneid.*"

The following year, in an article in which he reviewed his own work (Archiv. für Naturg., Vol. 2, 1835, p. 288), Wiegmann designated *Scincus pavimentatus* as the type of the genus by a statement in which he says that both *Scincus rufescens* Merrem and *Scincus punctatus* Schneider had been included in the group due to error, and that both belong to the genus *Euprepes, sensu strictu*, while only *Scincus pavimentatus* Geoffroy belongs to *Eumeces.* Thus, with a single species in the genus, this species must become the genotype. And since Wiegmann must be considered the first reviewer, the genus *Eumeces* must stand.

Duméril and Bibron (Erpétologie Générale, 1839, V, pp. 629, 630), after discussing at length the group *Eumeces* of Wiegman, state:

"Il résulte de ces diverses observations que le sous-genre Eumèces de M. Wiegmann ne repose pas sur des bases assez fixes pour que nous puissions le conserver; nous en prenons simplement le nom pour l'appliquer au groupe dont les caractères essentiels sont exprimés dans la diagnose mise en tête de cet article, groupe auquel nous donnons toutefois pour type une des trois espèces d'Eumèces de M. Wiegmann, ou le *Scincus punctatus* de Schneider."

It is apparent that these reviewers were unaware of the second contribution on the subject by Wiegmann himself, so that their choice of a genotype cannot stand. In the above work these authors associated under the genus (sous-genre) *Eumeces* Wiegmann, the following forms: *Eumeces punctatus* Wiegmann [= *Riopa punctata* (Linné)]; *Eumeces sloanii* Duméril and Bibron [= *Mabuya sloanii* (Daudin)]; *Eumeces spixi* Duméril and Bibron [= *Mabuya aurata* Schneider (part.)]; *Eumeces mabouia* Duméril and Bibron [= *Mabuya nigropunctata* (Spix)]; *Eumeces freycinetii* Duméril and Bibron [= *Emoia atrocostatum* (Lesson)]; *Eumeces carteretii* Duméril and Bibron [= *Emoia cyanogaster* (Lesson)]; *Eumeces baudinii* Duméril and Bibron [= *Emoia baudinii* (Duméril and Bibron)]; *Eumeces lessonii* Duméril and Bibron [= *Emoia cyanura* (Lesson)]; *Eumeces opelii* Duméril and Bibron [= *Riopa rufescens* (Shaw)]; *Eumeces microlepis* Duméril and Bibron [= *Riopa microlepis* (Duméril and Bibron)].

For the species listed by Wiegmann as *Scincus pavimentatus* and certain other related forms, Duméril and Bibron erected the genus *Plestiodon* and associated in the genus four presumed species, as follows: *Plestiodon aldrovandii* [= *Eumeces schneiderii* (Daudin) (part.) and *Eumeces algeriensis* (Peters) (part.)]; *Plestiodon sinense* Duméril and Bibron [= *Eumeces chinensis* (Gray)]; *Plestiodon laticeps* [= *Eumeces laticeps* (Schneider)]; *Plestiodon quinquelineatum* [= ? *Eumeces fasciatus* Linné)]; and *Plestiodon pulchrum* [= *Eumeces chinensis pulcher* (Duméril and Bibron)]. No genotype is mentioned.

The specific forms now recognized under the *Schneiderii* group were placed in a single species; and another recognized form, *Euprepes lynxe* Wiegmann, was placed in the synonymy of the species *Eumeces fasciatus*.

Fitzinger (Syst. Rept., 1843, p. 22) designates the genotype as *Pleistodon quinquelineatum* [= ? *Eumeces fasciatus* (Linné)].

Many subsequent authors followed Duméril and Bibron in their interpretation of the genus *Eumeces*. Thus we find in Günther's "Reptiles of British India" (1864) a list of sixteen species placed in the genus, none of which are now recognized as belonging to *Eumeces* Wiegmann. The three species of true *Eumeces* treated in the work, *Eumeces quadrilineatus* (Blyth), *Eumeces chinensis* (Gray), and *Eumeces schneiderii* (Daudin) are placed in the genus *Mabuya* Fitzinger, as *Mabouia quadrilineata, Mabouia chinensis* and *Mabouia aurata,* respectively. A fourth species, erroneously placed in this group, is *Mabouia maculata* Blyth [= *Sphenomorphus maculatus* (Blyth)].

Boulenger (Cat. Liz., III, 1887) and Cope (Croc., Liz. Snakes, 1900) have both utilized the genus *Eumeces* for the lizards associated under the designation *Plestiodon* by Duméril and Bibron.

A few other names, some emendations, have been proposed for species now recognized in the genus *Eumeces.*

Pleistodon. This was an emendation of Fitzinger (Syst. Rept., 1843, p. 22), who designated the type of Duméril and Bibron's genus as *Pleistodon quinquelineatum* (Linné).

Parioccla Fitzinger (*loc. cit.*) The type designated is *Pleistodon laticeps* (Schneider).

Plistodon Agassiz, Nomen. Zool. Index Univers., 1848, p. 863 (Emendation).

Eurylepis Blyth, Journ. Asia. Soc. Bengal, XXIII, p. 739. This name was proposed for a species of Indian skink named *taeniolatus* and characterized by broad plates across the back.

Lamprosaurus Hallowell, Proc. Acad. Nat. Sci. Phila., 1852, p. 206. This genus was erected for a young specimen of *Eumeces obsoletus* which Hallowell named *Lamprosaurus guttulatus.* The adult *Eumeces obsoletus* he placed in the genus *Plestiodon.* The character used for the separation of the two forms appears to have been the apparent absence of pterygoid teeth in the young specimen—"no palatine or sphenoidal teeth."

In 1857 (Proc. Acad. Nat. Sci. Phila., pp. 215, 216), having obtained other specimens of the same species, he considers them as belonging to *Plestiodon* and discards his own generic name with the following statement: "The original specimen from New Mexico was in such a condition as to render it extremely difficult to determine its true characters." He still failed to realize that he was dealing with the young of *obsoletus.*

Platypholis A. Dugès, La Naturaleza, Ser. 2, T. I, 1887-1890,

pp. 485, 486. This generic designation was proposed for a Mexican species, which he describes under the name *Eumeces altamirani*, in the following manner:

"¿Debemos considerar este escincóideo como una variedad monstruosa ó el adulto del *Eum. Hallowelli?* No lo creo, porque además de otros caracteres menos importantes que los separan, se observa una regularidad tal en la coalecencia de las escamas medianas de todo el dorso, que defícilmente se puede considerar esta disposición como un caso de anomalía. Como esta particularidad es desconocida entre los otros escincóideos creo que si no hay lugar de establecer un género especial para el *Eumeces Altamirani*, á lo menos se le debe conservar con justicia el nombre específico que le impongo; pero si se creyese conveniente formarlo, se le puede llamar PLATYPHOLIS."

The action of Duméril and Bibron in proposing *Plestiodon* for this group does not change or modify the proposal of Wiegmann in 1835. However, it has influenced many subsequent authors. As late as 1908 Arthur Erwin Brown (Proc. Acad. Nat. Sci. Phila., 1908, p. 112), after a short review of the forms listed in the Wiegmannian genus *Eumeces*, concluded that *Plestiodon* is the available name for the genus, a suggestion that was followed by many American herpetologists, the name appearing as late as 1917 in the Stejneger and Barbour checklist of North American Amphibians and Reptiles.

However, in the edition of 1924 of this same work, *Eumeces* was again restored, and one of the authors, in 1926 (Stejneger, Proc. U. S. Nat. Mus. Vol. 66, p. 45), points out the steps by which he has determined the type of the genus.

GENERIC RELATIONSHIPS

Within the family Scincidae, *Eumeces* belongs to the section characterized by conical maxillary teeth, the presence of pterygoid teeth, and an unmodified tail—the section also occupied by the genera *Mabuya* and *'Lygosoma'* Boulenger, although certain members of the genus *Mabuya* display a tendency toward bicuspid teeth, and some of the lygosomoid genera likewise show a departure from the typical conical teeth.

When compared with *Mabuya,* it is noted that *Eumeces* has the palatine and pterygoid bones separated on the median line of the palate. However, this is a variable character in *Eumeces,* some forms having these elements widely separated, others showing a closer approach or actual contact, at least of the palatines, anteriorly.

When compared with *'Lygosoma'* we find that here, too, variation obtains in the relation of the palatines to each other (usually, if not always, meeting on the mesial line of the palate) and the pterygoids are in contact at least anteriorly.

In the conformity of external characters the approach in the greater number of points appears to be closest to certain smooth or nearly smooth-scaled forms of *Mabuya.*

Thus, the nostril is pierced in a nasal, and a postnasal is present. There are two loreals and two presuboculars; the superciliary series bears the same general characters; the series of enlarged plates on the lower eyelid, the paired prefrontals, the paired frontoparietals, the four supraoculars, the lobules on the edge of the auricular opening, and other very numerous characters are practically the same in the two genera. The temporals, however, are not, at least in specimens of *Mabuya* examined, clearly differentiated, as they are in *Eumeces.*

In certain lygosomoid genera (notably *Dasia*), we find a close approach to the characters of the temporal scales and the widened subcaudals of *Eumeces,* but as regards many other characters, a much greater difference obtains than in *Mabuya.*

At no point, however, do the genera approach so closely that there can be any confusion in placing the known forms in their proper genus.

GROUPS WITHIN THE GENUS

- I
  - A
    - a
      - 1. SCHWARTZEI GROUP
    - b
      - 2. TAENIOLATUS GROUP
  - B
    - c
      - 3. SCHNEIDERII GROUP
- II
  - C
    - d
      - 4. LONGIROSTRIS GROUP
- III
  - D
    - e
      - 5. LYNXE GROUP
    - f
      - 6. SUMICHRASTI GROUP
    - g
      - 7. FASCIATUS GROUP
      - 8. BREVILINEATUS GROUP
    - h
      - 9. OBSOLETUS GROUP
    - i
      - 10. MULTIVIRGATUS GROUP
      - 11. ANTHRACINUS GROUP
  - E
    - j
      - 12. SKILTONIANUS GROUP
      - 13. QUADRILINEATUS GROUP
      - 14. BREVIROSTRIS GROUP
  - F
    - k
      - 15. EGREGIUS GROUP

EUMECES A GENERIC ENTITY

In dealing with the genus *Eumeces* it has been convenient to associate certain related species into groups, but with no intention in mind of considering them of the status of genera or subgenera. However, since certain earlier authors have proposed generic names for species or groups of species now recognized in the genus *Eumeces,* it may be wise to consider the characters on which these generic names have been proposed.

It will be noted in the arrangement given above, that the species fall readily into three groups. This grouping is based on the character and relationship of the preanal scales (see key). Section I includes the *Taeniolatus, Schwartzei* and *Schneiderii* groups; Section II, the *Longirostris* group; and Section III, the remaining eleven groups. Should these groups be considered worthy of generic (or subgeneric) distinctions, we find that the oldest generic designation for the first is *Eumeces,* since *E. pavimentatus* of the *Schneiderii* group is the type of the genus (designated by Wiegmann in 1835). For the second, the *Longirostris* group, no name has been proposed. For the third group the name *Pariocela* Fitzinger is the oldest available generic name (*Eumeces laticeps* the type), rather than *Plestiodon,* since Duméril and Bibron apparently consider *E. pavimentatus* (the type of *Eumeces*) as the type of their genus, and it is therefore a synonym of *Eumeces. Pleistodon* of Fitzinger, with *Pleistodon quinquelineatus* as type, is an emendation.

In the second grouping of six sections the following associations obtain. The old section I is divided into two groups, group A containing the *Taeniolatus* and *Schwartzei* groups, and for which two names have been proposed: *Eurylepis* Blyth (1854) (*Eumeces taeniolatus* the type) and *Platypholis* Dugès (1887), with *E. altamirani* as the type. The latter generic name, however, is preoccupied. For group B, including the *Schneiderii* group, the name *Eumeces* would be available. Group C (identical with section II, including *longirostris*) is without a name, as noted previously. Group D, including the *Lynxe, Sumichrasti, Fasciatus, Brevilineatus, Obsoletus, Multivirgatus* and *Anthracinus* groups, has available Fitzinger's *Pariocela* (1843). A second name, *Lamprosaurus* Hallowell (1852) (type *Eumeces obsoletus*), is available if *Pariocela* were untenable. For group E, including the *Brevirostris, Skiltonianus* and *Quadrilineatus* groups, no generic name has been proposed; nor has a generic name been suggested for group F, including the *Egregius* group.

The likelihood that further generic or subgeneric divisions of the genus will ever be considered for species now known is extremely remote.

Boulenger (1887) apparently is the first recent author to treat the genus as a whole, and since this work was published the only suggestion of a generic division is that of Dunn (1933), who states, "These are the only Eumeces [viz., *schwartzei, managuae, scutatus* and *taeniolatus*] with enlarged middorsals, and it is obvious that they form a natural and a closely related subgroup of the genus. Indeed, in some ways each of the American species is more like one of the Indian species than it is like its American relative. The distribution, the Punjab, the east coast of southern Mexico, and the west coast of Nicaragua, is quite wierd; but the American species have certainly no direct relationship with any other American Eumeces. Save for the recently described *schmidti* from Honduras, which is close enough to *fasciatus, schwartzei* and *managuae* are the only New World Eumeces south of the Mexican Plateau. I am somewhat inclined to use Eurylepis Blyth (1854, Journ. Asiatic. Soc. Bengal 23, p. 739, type *taeniolatus*) as a name for these four "Eumeces" with enlarged middorsals."

That this character is not a "fixed" character is evidenced by the variation that obtains in the number of these dorsals that are fused or divided in the individual species. Since only a part of the two median dorsal rows fuse there is usually a double series of scales following the nuchals that are not fused, and in some forms, a double series following the fused series, anterior to the base of the tail. Should one wish to separate these forms it seems quite likely that other characters less obvious but certainly of more "generic" importance should be used; but when other differential characters are used, the association of *taeniolatus* appears closer to members of the *Schneiderii* group, which would thus necessitate the erection of a name for members of the *Schwartzei* group.

I feel quite certain that any breaking up of the present group here treated as a generic entity is unwise, since, if begun, it would necessitate the erection and recognition of several genera, four of which (including *quadrilineatus, egregius, taeniolatus, lynxe*) would be monotypic and would in no measure have the same generic significance as even the genera (subgenera) formed from the genus "*Lygosoma*" as used by Boulenger.

It is significant that the recent study of the skulls of *Eumeces* by Kingman (1932) shows no osteological differences of sufficient import to warrant generic separation.

The more one considers the problem of breaking up the genus *Eumeces* (as currently comprehended) into genera and subgenera of doubtful validity, the greater becomes the certitude that we are dealing with a single generic entity, all of whose species are quite clearly and entirely set apart from any other such generic groups and whose relationships among themselves is such as to warrant a single generic association.

PHYLOGENETIC TREE

The following figure expresses in general my opinion of the relationships of the various species. I conceive of the ancestral type as a medium-sized, five-lined skink approximating *fasciatus*

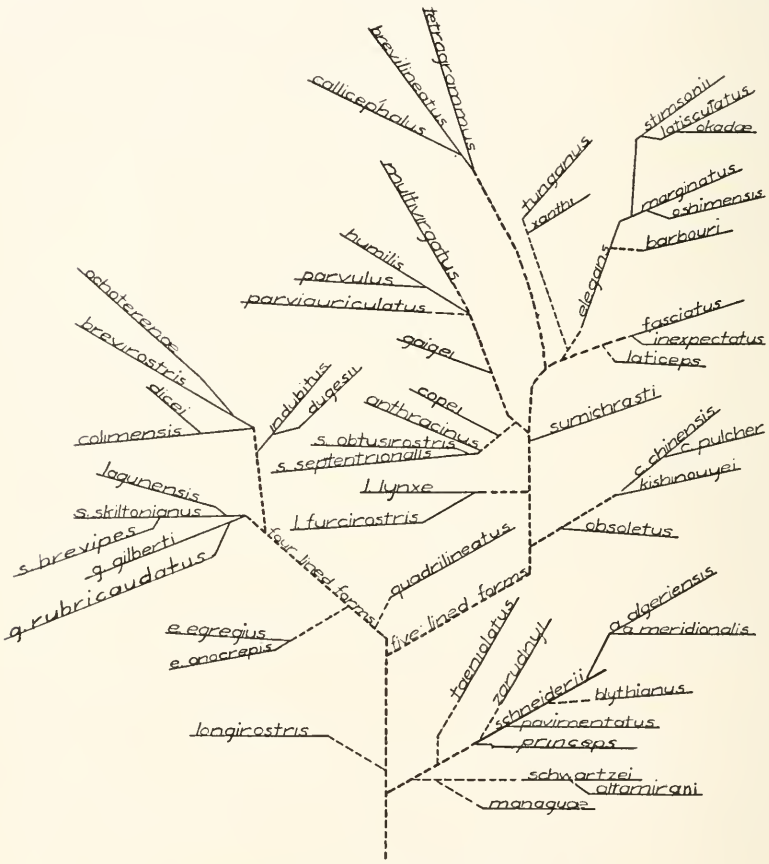


FIG. 1. Phylogenesis in the genus *Eumeces* Wiegmann.

in size, character and habits. The relationships of *gaigei* and *parviauriculatus* are in doubt. It is possible that the former may actually be a derivative of the *Brevilineatus* group, allied with *callicephalus;* and that the latter may be a derivative of the *Brevirostris* group, a relative of *ochoterenae.* The evidence for these associations is equally as strong as that which has caused me to associate them with the *Multivirgatus* group. The young of these, when discovered, may offer more certain clues. Should the other relationship be the correct one, their present resemblances may be explained as the effect of similar environment.

GENERIC DESCRIPTION

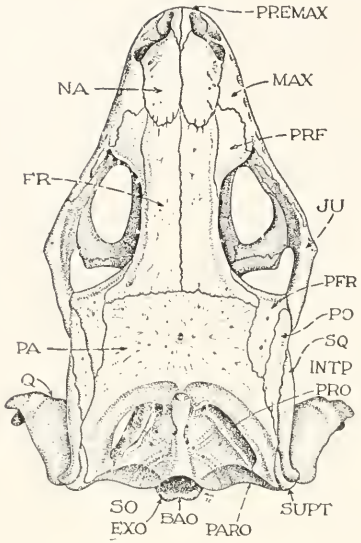
The genus may be defined as follows: Maxillary and mandibular teeth conical or with rounded, spheroid crowns, variable in number; the premaxillary teeth, usually three on left side, four on right side; pterygoid teeth present, variable in size and number; prevomerine teeth present or absent (usually two when present); the palatine bones not meeting on the median plane of the palate, but varying in degree of proximity; pterygoids separated on median line.

Eyelids well developed, the upper eyelid variable (better developed in African and western Asiatic forms); tympanum present, deeply sunk; nostril pierced in a nasal, which may be single, partly divided by a suture or more or less completely divided, in which case the nostril is between the two moieties; supranasals present; never more than four supraoculars; prefrontals, frontoparietal and interparietal distinct. Limbs well developed, pentadactyl, all digits clawed; digits subcylindrical or compressed, with transverse lamellate scales below, which may be compressed, keeled or padlike in character. Body scales usually small, more or less cycloid, occasionally fusing dorsally into larger plates.

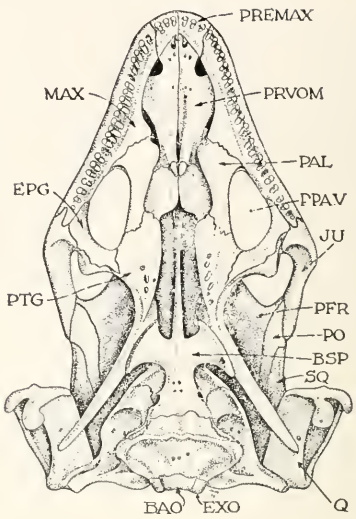
DESCRIPTION OF THE SKELETAL ELEMENTS OF EUMECES

I have chosen as a type for this description, a skeleton of a specimen of *Eumeces obsoletus* from Kansas. The description of the skull is taken from Kingman (1932).

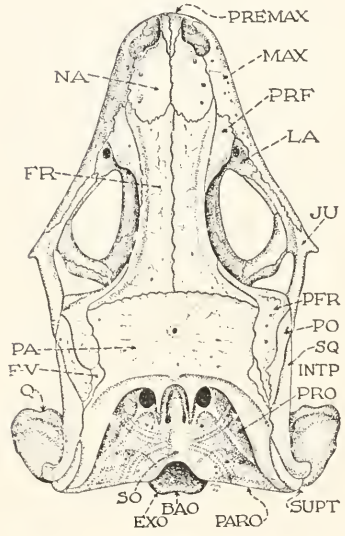
"Frontal. The frontal bones are two in number located between the orbits of the eye and beneath the frontal and frontoparietal scales of the dorsal surface of the head. In the median line each is flattened except for slight depressions, while along the sides extending from the orbit to its anterior extremity there is a beveled edge that forms the support for the supraocular



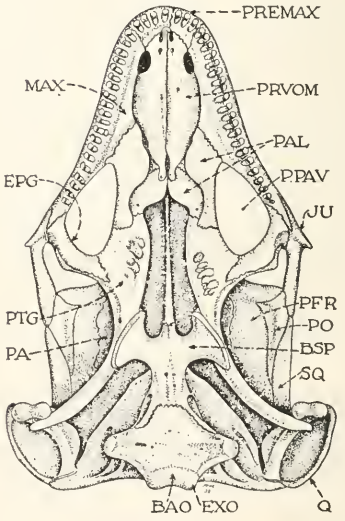
1. Eumeces chinensis.



2. Eumeces chinensis.

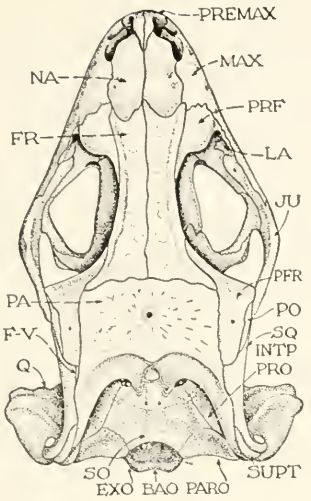


3. Eumeces obsoletus.

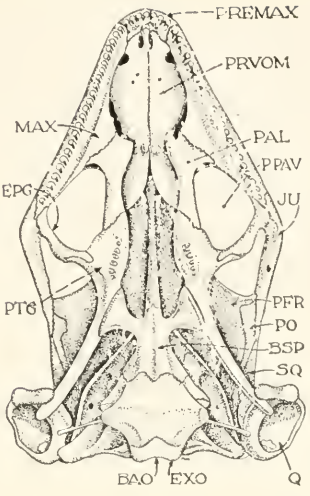


4. Eumeces obsoletus.

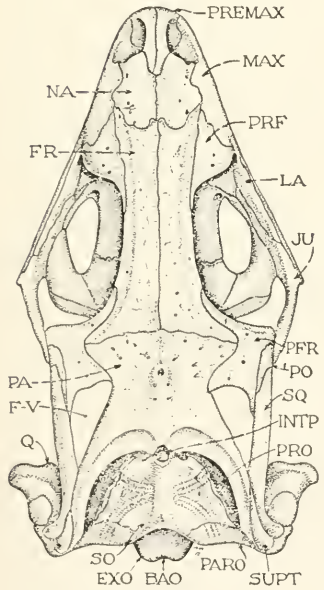
FIG. 2. 1, *Eumeces chinensis* (Gray) Amoy, China. Male. E. H. T. Coll. No. 880; 2, Same, ventral view. 3, *Eumeces obsoletus* (Baird and Girard), Lawrence, Kan. E. H. T. Coll. No. 881. 4, Same, ventral view. From Kingman (1932).



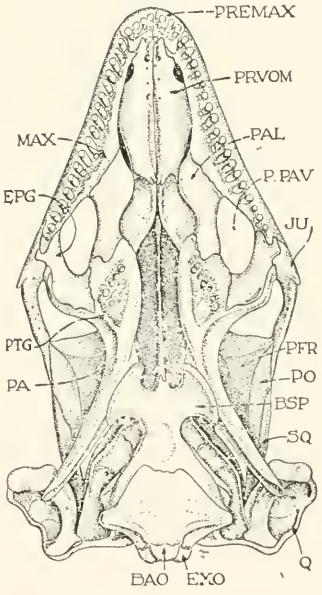
1. Eumeces laticeps



2. Eumeces laticeps.



3. E. schneideri pavimentatus.



4. E. schneideri pavimentatus.

FIG. 2a. Skulls of Eumeces. 1, *Eumeces laticeps* (Schneider). K. U. No. 9127, Imboden, Ark.; Byron Marshall Coll. Adult female; dorsal view. 2, Same specimen, ventral view. 3, *Eumeces pavimentatus* (Geoffroy-St. Hillaire). E. H. T. No. 860, Haiffa, Syria. Dorsal view. 4, Same specimen, ventral view. From Kingman (1932).

scales above the eyes. Anteriorly it articulates with the nasal bone, to which it unites along a crescentic suture from the median line. In the anterior lateral portion of the orbit it is in contact with the prefrontal. A small maxillary process is found on the anterior lateral surface where it comes in contact with the maxillary bone lateral to the nasal suture. Posteriorly it meets the anterior edge of the parietal bone. Laterally along the margin of the orbit it is in contact with the postorbital.

"PARIETAL. The parietal is a single median bone located beneath the parietal, interparietal and nuchal scales of the surface of the head. This is composed of a more or less triangular body which has within it, in the median line, a small opening, the parietal foramen for the organ of the same name. The opening is a little anterior to the middle of the body of the bone. Extending posteriolaterally are two processes, the squamosal processes. These are curved and slightly recurved away from the median line. In the median line at the posterior border there is a prominent notch into which fits a membrane and a small knob-like element that suggests the location of an "interparietal." Lateral to this notch two posteriorly directed processes extend to meet the occipital bone. Along the median and posterior border of the parietal there is a marked ridge which is continuous with an obliquely directed surface for the attachment of the neck muscles of the skull.

"On the ventral surface of the body of the parietal bone and in direct line with the parietal foramen are two sliverlike processes which extend down almost at right angles to the remainder of the bone. These articulate with the epipterygoid and with the latter enforce the upper jaw and gave rigidity to the membrane surrounding the brain.

"The parietal articulates with the following: frontal, squamosal, postfrontal, paraoccipital, and epipterygoid bones.

"SUPRAOCCIPITAL. The supraoccipital is an unpaired median element fused, in the adult, at the basal part of the skull with the exoccipitals, paroccipitals and some of the bones of the otic capsule. The posterior and lateral limits of this element cannot be distinguished in the adult. It probably forms a median raised area from the foramen magnum forward to the median line of the parietal as well as a slight flattened process on either side of raised median portion. These flattened processes contain the median portions of the semicircular canals which are visible from the dorsal surface.

"EXOCCIPITALS. The exoccipitals form the sides of the foramen magnum and the lateral pieces of the occipital condyle. The occipital condyle is composed of three parts; the median piece is the basioccipital while the lateral two are exoccipital parts. The main portion of this bone is inseparably fused with the paroccipitals. The lateral processes articulate with the quadrate, parietal, squamosal and supratemporal bones.

"BASIOCCIPITAL. The basioccipital is placed ventrad to the foramen magnum forming about thirty degrees around that aperture. The general outline of this bone is suggestive of the shape of a diamond with its long axis running from left to right. Along the anterior and lateral border of this diamond-shaped area the basioccipital articulates with the basisphenoid by an irregular suture. In the adult a slight depressed groove remains, separating the basioccipital and the exoccipital bones.

"BASISPHENOID. The basisphenoid is located just anterior to the basioccipital, with which it articulates by an irregular suture. The body of this bone is more or less triangular with the base posterior and its apex extending to the interorbital rostrum anteriorly; which is in the region of the presphenoid. Extending laterally from the body are two fan-shaped processes, the pterygoid processes, which form broad but thin facets for the articulation with the pterygoid as it moves with the movement of the lower jaw.

"PROÖTICS. The proötics are two bones between the basisphenoid, basioccipital, paraoccipital and supraoccipital bones. In the adult the sutures are not clearly visible.

"PARASPHENOID (presphenoid). The parasphenoid is continuous with the basisphenoid and extends forward to the prevomers and palatines. This bone has been homologized with the vomers of mammals. This element in these lizards is cartilaginous and forms the ventral support for the interorbital septum. The space in which this is located is called the interpterygoidal space. It is impossible to see where it unites with the ethmoid or sphenethmoid in prepared skulls.

"QUADRATES. The quadrates are two conspicuous bones at the posterior and lateral surfaces of the skull, articulating directly with the pterygoid on the ventroanterior surface; with the paroccipital, supratemporal and squamosal on the dorsal and posterior border. Each quadrate is concave on its ventral posterior surface, while it is convex anteriorly. There is a double articular surface for the movement of the lower jaw; the tympanic membrane and the columella are parts articulated with this bone.

"PTERYGOIDS. The pterygoid bones are long (10 mm.) and extend about half the length of the entire skull on the ventral surface. The anterior portion may be considered the body, which bears teeth upon its ventral median surface. These teeth are placed in depressions and seemingly in two rows of irregular size and range from six to ten on each side. The teeth are rather heavy and are blunt at their extremity. This bone connects anteriorly with the palatines, laterally with the ectopterygoids and the jugals, while posteriorly it articulates with the quadrate, and about its middle with the basisphenoid. (The posterior process is a thin knifebladelike process passing from the basisphenoid to the quadrate.) Its articulation with the ectopterygoid is by a broad, flat surface directly under the ectopterygoid bone. The ectopterygoid, or os transversum, with the pterygoid process together produce the posterior bar, the limit of the postpalatine vacuity.

"ECTOPTERYGOIDS (*os transversum* or *transpalatines*). There are two ectopterygoids, and they extend from the maxillary and jugal bones to the pterygoid, and these are the only bones with which they articulate.

"EPIPTERYGOIDS. The epipterygoids are a pair of slivershaped bones extending from the dorsal surface of the pterygoid to the parietal bone. The union with the pterygoid bone is made by means of a socket in which the enlarged end of the epipterygoids fit. The other end of the epipterygoid is attenuated and meets a sliverlike process extending down from the parietal bone, with which it articulates.

"PALATINES. The palatines are two in number and meet in their anterior portion. There are two plates that make up this bone, one located dorsally

and one ventrally; both plates are united along the lateral margins. The ventral plate is nearly flattened and is continuous with the broad palatine process from the alveolar surface of the maxillary bone. Posteriorly it is continuous with the anterior surface of the pterygoid. The dorsal plate has a somewhat curved surface as well as a double curved margin along the median line. At the anterior surface of this plate the left and right palatine bones come in contact. This contact is directly posterior to the prevomer teeth, which project back a little distance in the median line. The dorsal plate articulates with the prevomers anteriorly while posteriorly it unites with the pterygoids as does the other. The space between the dorsal and ventral plates of the palatine bone produces a passage for air down the sides of the prevomer to the nasal passage.

"PREVOMER (*vomers,* but not homologous with the vomer of mammals). The prevomers are represented in this form by a single inseparable piece in the adult, which has all evidence of being composed of two distinct parts united in a groove in the median line. At the posterior end of the plate near the median groove is found a pair of toothlike processes that may be considered the homologue of prevomerine teeth. Extending from these processes forward is a gentle ridge which becomes flattened near its articulation with the premaxillary bones. At the extreme anterior end in the median line is a tubercle with a cartilaginous tip and a slight depression on either side. Two openings may be seen along the lateral margin next to the maxiliary bones; these seem to connect with a cavity in the prevomers and may be the opening to Jacobson's organ. Posterior to these openings and along the margin in the maxillary bone is a slitlike passage which is continuous with the nasal passage above.

"PREMAXILLARY. The premaxillary bones are two in number and are located on the anterior surface of the upper jaw. There are two distinctly separate bones in this form. Left and right elements are not equal in size as the right one is slightly larger, having four teeth while on the left side only three are present. The premaxillary bones articulate dorsally and posteriorly with the nasal bones, laterally and posteriorly with the maxillary bones and ventrally with the prevomers. The dorsal median processes form a separation between the external nares.

"MAXILLARIES. The maxillary bones are elongated bones that constitute the outer edge of the upper jaw and bear the majority of the teeth in this region. They form the posterior and lateral margin of the external nares and the lateral margin of the postpalatine vacuity and lateral margin at anterior edge of the orbit of the eye. The maxillary articulates with the following bones: anteriorly with the premaxillaries, prevomers, nasals and septomaxillae; posteriorly with the frontals, prefrontals, lachrymals, jugals, and ectopterygoids; and medially with the palatines. The outer edge of the ventral surface of the maxillary bone is raised into a flange, while the inner surface is on a lower level and is continuous with the palatine bone. The nearly cylindrical teeth are fastened to the lower surface of this bone and also to the raised flange, making the teeth pleurodont in attachment. Smaller teeth are visible on the lower surface and are the replacing teeth for worn-out older ones.

"JUGALS. The jugal bones are narrow bones forming the angle of the upper jaw and the outer and posterior margin of the orbit. The entire shape suggests that of a hockey stick. The straight handle-shaped portion is fastened near its end along the edge of the orbit, making up part of the lateral border. The ventral part is curved and meets the maxillary at its posterior end. Here it becomes narrowed to a very thin process that is lodged between the maxillary, ectopterygoid and lachrymal bones. On its dorsal and posterior end it articulates with the postfrontal, postorbital, and squamosal. On the ventral surface of the jaw a posterior lateral spine is seen as though it were a continuation of the upper jaw.

"SQUAMOSALS (*paraquadrates* of Gaupp). The squamosals as here identified articulate in front with the jugal and postorbital, at about the middle of its extent with the parietal, and posteriorly with the quadrate, supratemporal and paroccipitals. It is a flattened curved bone forming the outer border of the dorsal surface of the skull. This bone is undoubtedly not a quadratojugal, as the lateral temporal vacuity is not formed because of the disappearance of the lateral arcade.

"SUPRATEMPORAL (*supramastoid,* suprasquamosal, tabular of Noble, or *squamosal* of Gaupp, *epiotic, postparietal*). These bones are two small, insignificant, sliver-shaped bones located between the squamosal and parietal bones laterally, while posteriorly they articulate with the quadrate and paraoccipital processes. They are never in contact with the postorbital and postfrontal bones in this form. In disarticulated skulls and in some prepared skulls there is an additional element that may be an atrophied tabular or quadratojugal. In most skulls it is represented as an aperture on the quadrate near its articulation with the squamosal and supratemporal at the place of its articulation.

"POSTFRONTALS. The postfrontal bones form the posterior border of the orbit. A thin, narrow piece extends along the margin of the frontal bone and the orbit; the body of this bone is a nearly leaf-shaped element in contact with the parietal medially and with the postorbital laterally and with the jugal on its anterolateral surface at the posterior lateral boundary of the orbit. Its posterior extremity is variable both on left and right sides on the same skull as well as in different skulls.

"POSTORBITALS (*postfrontals*—Gaupp). The postorbitals, two small bones in this skull, do not form part of the orbit nor part of the edge of the skull. They articulate with the postfrontal, squamosal, jugal and by a slight point touch the parietal on one side in one skull studied. Each borders on the fontanelle or vacuity on the dorsal surface of the skull. Its variation will be brought out in the comparisons of the various species to follow. Ventrally it presents a triangular appearance.

"PREFRONTALS (*lachrymals* of mammals—Gaupp). The prefrontal bones are located at the median anterior end of the orbit; they are inseparably united with the lachrymal bone, articulating with the frontal, maxillary and lachrymals. A part of the suture remaining suggests the place of union with the lachrymal. A marked ridge and a groove just below shows the point of attachment of the small supraocular bone, which is found in careful preparations. It is easily removed with the skin unless extra care is used.

"LACHRYMALS. The lachrymal bones are at the anterior extremity of the

orbit and are, as previously stated, fused in the adult with the postfrontals. Each is characterized in this form by having a foramen penetrating it from the orbital side into the nasal cavity, and articulates with the maxillae, jugals, and prefrontals.

"NASALS. The nasal bones form part of the septum between the external nares as well as part of the posterior boundary of the same. These bones are thin plates nearly ovoid in shape, with their anterior median extremities covered by the dorsoposterior projections of the premaxillary bones. Posteriorly they articulate with the frontals and laterally with the maxillae. The small septomaxillae probably do not come in contact with this element, but do with the maxillary bone.

"STAPES. The stapes are thin cylindrical bones that fit into the foramen ovale of the paroccipital process. They pass out posteriorly to the quadrate, where they seem to be strengthened in their position by this bone and by the tympanic membrane on the outer surface of the head."

DENTARY. This element extends posteriorly almost to the middle of the base of the coronoid on its lower surface. It bears 22 pleurodent teeth which point upward and outward, the extreme tips being slightly recurved; the upper inner face of the bone has a beaded rim, forming a trough at the base of the toothrow.

SPLENIAL. This bone is elongate, extending as far back as the dentary. Anteriorly it borders an elongate foramen and has another small foramen near its anterior end. It does not reach the edge of the beaded inner side of the dentary.

CORONOID. The upper free edge of the coronoid is elevated about a millimeter above the ramus, with a forward projecting base which meets and forms a posterior continuation of the beaded inner edge of the dentary. The inner free edge is raised above the inner level of the ramus. There is no posterior projection, and only a slight projection forward on the outer face of the ramus. On the inner face of the ramus, the lower edge of the coronoid forms a semicircle.

SURANGULARE. This element is rather extensive on the outer posterior face of the ramus. It is notched somewhat by the angulare posteriorly.

ANGULARE. This element shows a short anterior notch in which is inserted the posterior lower part of the dentary; a similar notch occurs in the posterior border.

PREARTICULARE. This narrow element extends forward to the anterior lower part of the coronoid and appears to be (at least partially) free from the articulare.

ARTICULARE. The upper surface of the articulare has several ridges and depressions, the anterior part of the articular surface

raised, forming an elevation somewhat less in height than the coronoid projection; the posterior part of this element is thin and flattened.

STERNUM AND RIBS. The anterior edges of the sternum form a right angle, the edges strongly grooved longitudinally. The posterior edges are scalloped. Two posterior foramina are present. The ribs of the ninth, tenth, and eleventh vertebrae join the sternum. The xiphisternum is elongate, divided throughout its length, forming two equal moieties. Ribs from the twelfth vertebra attach near the middle, those from the thirteenth and fourteenth attach at the posterior end of the xiphisternum. The ribs following are free, their terminal joint curving inwards.

VERTEBRAL COLUMN. There are eight vertebrae anterior to those with ribs attaching to the sternum. The epistropheus is large, with a large spine, which is much lengthened, having both an anterior and a posterior projection. The other vertebrae have a rather narrow posterior spine. The first vertebra following the epistropheus apparently lacks ribs; those of the next three with short, flattened ribs, while on the two following the ribs are elongate and slender. There are nineteen thoraco-lumbar vertebrae, all bearing ribs. Two fused sacral vertebrae are present, their processes somewhat widened distally. Chevron bones begin on the fourth caudal vertebra.

PECTORAL GIRDLE AND FORELIMB. The interclavicle is in the form of a maltese cross, the lateral wings narrow, not widened at their bases; the anterior wing reaches as far forward as the anterior edges of the clavicles on their under side. Clavicles meeting on median line, where they are slightly widened with one or two somewhat mediad fenestrae. The bone then narrows slightly and then widens again at the angle of the bone. It then becomes much narrowed when it joins the suprascapula. This latter element is narrowed at the point of contact with the scapula, but is much widened distally. The scapula is broad at the point of contact with the suprascapula; and then it narrows considerably where it fuses with the coracoid. The precoracoid and supracoracoid are fused with the coracoid. The epicoracoid cartilage borders the medial edge of the combined coracoid, and helps inclose two large, nearly equal-sized, fenestrae, the outer of which may not be completely inclosed. The forelimb is well developed. The humerus is distinctly longer than the radius or ulna. The ulnare and radiale are

large, articulating directly with the lower ends of ulna and radius respectively. The centrale is present, but the intermedium is probably wanting or fused with another element; five carpalia are present. The pisiforme is somewhat ventral to the end of the ulna. The formula for the phalanges is: 2-3-4-5-3. The middle finger is slightly the longest.

PELVIC GIRDLE AND HIND LIMB. The ilia are directed backward in contact with two sacral vertebrae. The pubic bones are narrow, forming a right angle at the symphysis. Near the junction of the pubis with the ischium there is a narrow, very strongly curved ventral process. The ischial symphysis is somewhat elongate, the bones being wider at this point than elsewhere, forming a forward projecting point. The foramen cordiforme is very large. Each ischium has a small posterior projection. I cannot find an os hypoischium in this species and believe that it is normally wanting.

The femur is heavy, and slightly longer than the tibia. Between the articulation of the femur with the fibula is a small rounded sesamoid (patella) and two small sesamoid elements about the ventral side of the articulation of the femur and the tibia. The astragalus and calcaneum are fused. There are only two tarsalia present. The phalangeal formula is: 2-3-4-5-4.

The characters of the bony elements vary somewhat in the various species. Kingman (1932) discusses variation in the cranial elements. These differences do not involve the loss of any elements, nor the presence of added elements. He notes some differences in relationship of the bones, and in the size of fenestrae, number of teeth, and proportions of various skull elements. My skeletal material other than skulls is so limited that at this time I have not made a comparative study of the skeletons of the various species.

GENERAL DISTRIBUTION

The present distribution of the genus *Eumeces* is probably more restricted than formerly, since there are four discontinuous areas now occupied. These are: An area in the western hemisphere comprising the southern edge of Canada, the United States, Mexico and part of Central America; the isolated Bermuda Islands; an area comprising the northern edge of Africa and part of southwestern Asia; and a fourth area including part of southeastern Asia and the island arcs lying to the east.

It is probable that in North America, during glacial periods, species have been forced to the south. At the present time it seems

probable that they are pushing farther north. Their absence from Europe is probably due to glaciation; and their present restricted distribution in Africa is due to limitation by the desert. The break in the continuity of their distribution in Asia seems to be caused by desert and plateau factors. I offer no explanation of the species on the isolated Bermuda Islands.

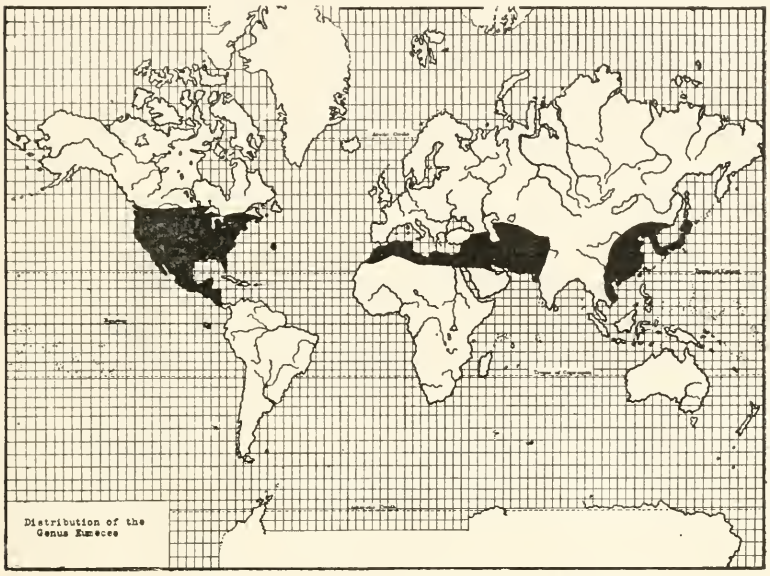


FIG. 3. Distribution of the genus *Eumeces* Wiegmann.

MEXICAN AND CENTRAL AMERICAN FORMS

Mexico and Central America have no less than eight of the fifteen groups recognized in this work, all occurring in the Mexican territory, while only two enter Central America. The *Skiltonianus, Obsoletus* and *Anthracinus* groups are largely American in distribution, although the latter extends as far south as the plateau itself, if the species *Eumeces copei* is properly associated with this group, a matter about which there may be some doubt. The territory occupied by this species is not contiguous with that of other members of the group.

The *Schwartzei* and *Sumichrasti* groups are south Mexican and Central American in distribution and are confined to territory bordering the southern part of the Mexican Plateau, or lying to the south of the plateau.

The *Lynxe* group belongs to the high plateau region, as does

largely the *Brevirostris* group. Certain species, at least, in both of these groups have developed ovoviviparity. The *Brevilineatus* group appears to occupy territory in both lowland and highland regions, some species being adapted to both habitats.

The factors governing the distribution of certain of the various species of the genus in Mexico are indeed obscure, the usual controlling factors of elevation, temperature and barriers being in a large measure disregarded, since at least certain of the known forms occur in the plateau region and in the low coastal region as well. Certain forms occupy restricted areas, and others are widespread. Each species apparently must be regarded as a law unto itself, and considered individually.

The most distinctive forms of this fauna are those belonging to the *Schwartzei* group: *schwartzei, managuae* and *altamirani.* The two latter species, known as yet from only one or two specimens, offer little data save that *managuae* is from low elevation on the shore of Lake Managua, while the type locality of *altamirani* is "regiones calidades del Estado de Michoacán" (presumably near Apatzingan), which lies south of the plateau edge. The records for *schwartzei* show it to be a lowland form; the type locality, a small island in Laguna de Términos, Campeche, is near sea level. These three form a compact group whose closest relatives, judging by scale characters, may be western Asiatic forms.

The type locality of *E. sumichrasti,* placed in a group of the same name, is usually accepted as Orizaba, Vera Cruz. Whether this refers to the neighborhood of the mountain, to the town, or is an error, cannot be stated, since the specimens collected by Ferdinand Sumichrast did not always bear accurate labels. In his own report of the species he mentioned finding it at an elevation of 590 meters "en los encinales de Portrero" near Cordova. A record for Jalapa is the only one from a high elevation. Other reports of the species, from Vera Cruz, Mineral de Santa Fe, Chiapas (*E. rovirosae* Dugès) and Lancetilla and Tela, Honduras (*E. schmidti* Dunn), are all from sea level or relatively low localities.

Save for the detail of the color pattern on the head, the species resembles to a considerable degree the five-lined forms of southeastern United States, and in my opinion is a distant relative. This is based on the conformation of the scales, the five-lined color pattern, and the character of the pits on the scales, as well as body proportions. At no point, however, are their known ranges contiguous.

I have recently described and named *Eumeces copei*, a species long known from a brief description by Cope (1885), but associated with another species (*brevirostris*) as a variety without a name. This form occurs in the highland region, maintaining an elevation from about 5,000 to 10,000 feet, wherever it has been found. It exhibits certain color characters common to *septentrionalis* and *anthracinus*, but differs in the general character of the dorsal scales, as well as in the details of the color pattern. The relationship, if properly diagnosed, is more distant than obtains among the other members of the *anthracinus* group.

In the central southern highland region, occupying territory in San Luis Potosí, Guanajuato, Querétaro, Hidalgo, Vera Cruz and Tlaxcala, is a small group consisting of two closely related forms, *lynxe* and *furcirostris*. These small, five-lined forms, with the median line forking on the anterior part of the frontal, seem to be confined to the high plateau region, and their relationship with other groups is not clear. Numerous characters lacking in *lynxe* seem to suggest also a relationship not only with the five-lined forms of the *Fasciatus* group, but also with the *Brevilineatus* group, the members of which have lost all but the anterior part of the median line. They agree in the character of the scale pits. However, the members of the *Lynxe* group are ovoviviparous.

The species *obsoletus*, which is apparently closely related to *chinensis*, occurs in the northern part of Mexico. Specimens have been collected in northern Tamaulipas and northern Chihuahua. The range in Mexico must be much greater than these two records show. I have taken specimens in the southern part of Brewster county, Texas, within ten miles of the borders of Coahuila, and in the Huachuca mountains of Arizona, within two miles of the boundary of Sonora. So one is safe in prophesying its discovery in these northern Mexican states. This species occupies habitats from sea level (at Matamoros, Tamaulipas) to elevations of 8,000 feet in the Chisos mountains of Texas; from open hillsides in the wooded region of eastern Kansas to the semidesert areas of Arizona and Chihuahua. It would appear to be a very adaptable form.

The remaining forms known from Mexico have been placed into four groups: the *Brevirostris, Brevilineatus, Multivirgatus* and *Skiltonianus* groups, the latter known from Baja California in Mexico.

The *Brevilineatus* group is represented by three species (*brevilineatus, tetragrammus* and *callicephalus*), all three of which occupy areas on either side of the boundary, only one, *callicephalus* (which

reaches the state of Guanajuato), extending any considerable distance to the south. In the north (and considerably modified from the typical) *callicephalus* reaches the Gila river in Arizona. A vertical range of about 6,000 feet is evidenced.

Three representatives of the *Multivirgatus* group are known. In western Mexico, in the state of Nayarit, is a small species known from three specimens which I have recently described under the name *parvulus;* from Sonora another diminutive species, *parviauriculatus,* has been recently described; while a third, a variant of *multivirgatus,* is known from Sonora, New Mexico and Texas.

The *Skiltonianus* group extends from British Columbia throughout Washington, Oregon, Idaho, Nevada and Utah, occupying only the western part of Arizona, narrowing its range in the south so that it enters Mexico only in Baja California. As yet no species of those I have assigned to this group are known to occur in any other of the northern tier of Mexican states.

In Baja California three species are known: *S. skiltonianus, gilberti rubricaudatus* and *lagunensis,* the two former entering and occupying together the proximal end of the peninsula. *Lagunensis* occurs in the more distal parts. The probabilities that the ranges of *skiltonianus* and *lagunensis* overlap are small. Despite certain museum records *skiltonianus** is not known in other parts of Mexico.

The southern part of the plateau region is inhabited by two closely related species, *indubitus* and *dugesii,* of the *Brevirostris* group, the former occupying more southeastern territory than the latter, and differing from the latter in having four instead of three supraoculars, a divergence parallel to that which obtains between *lynxe* and *furcirostris.* Whether their territories actually overlap without intergradation is not known, although typical specimens of each apparently occur in Michoacán. The known distribution of *dugesii* is Guanajuato and Michoacán; that of *indubitus,* Morelos, Mexico and eastern Michoacán. Dugès' record for Chiapas is not substantiated by any known specimen in museums. *Brevirostris* occupies a considerable part of the highlands of southern Mexico. The species as here recognized is somewhat variable, and lack of sufficient material the cause of my failure to recognize certain of the variants subspecifically. The species is known from Vera Cruz,

* A specimen in the Harvard Museum of *Eumeces skiltonianus* purports to come from Acapulco, Guerrero, collected by a ship's captain, H. Davis. The specimen is properly identified, but is typical of individuals from the neighborhood of San Francisco. If the specimen was actually obtained in Acapulco, it had doubtless been carried there from some port in the western United States. The lower jaw has been pierced near the symphysis as if a string had been inserted for holding the animal. I am reluctant to accept the evidence of its presence in Guerrero on the basis of this specimen. Certain other museum records for southern Mexico are based on specimens of *brevirostris.*

Oaxaca, Puebla, Durango, Colima and Jalisco. With added material certain of these forms may be profitably separated as subspecies.

Three other forms are tentatively associated with this group: *ochoterenae* from Guerrero, *colimensis* from Colima and *dicei* from Tamaulipas. The last two are known only from type specimens; *ochoterenae* from a series of eleven specimens.

It is self-evident that exact limits of distribution of most species cannot at this time be plotted, and conclusions based on present inadequate data may have to be thrown into the discard both as to specific limits of forms, and the interpretation of their relationships, when future collections shall present a clearer picture of variation.

The presence of the genus in Central America has only recently been demonstrated through the discovery by Harry Malleis of *E. schwartzei* at Petén, Guatamala (three specimens); of *E. sumichrasti* (*E. schmidti* Dunn) by J. A. G. Rehn at Lancetilla and Tela, Honduras, in 1930 (two specimens); and the still more recent discovery of a distinctive new species, *E. managuae* Dunn, at the aviation field in Managua, Nicaragua, by James H. Ivy (one specimen). These three species, represented by six specimens, are the only known representatives of the genus south of the Mexican boundary. Conjecture as to whether future collections will prove the presence of *Eumeces* in South America is futile.

CANADIAN AND AMERICAN FORMS

The general distribution of the genus in this territory is from southern Canada, south to the Mexican boundary and Gulf of Mexico. In Canada the genus is authentically reported from southern British Columbia, Manitoba and Ontario; and perhaps also from Nova Scotia. It is highly probable that species occur in certain other border provinces. Only three species are known. *Eumeces skiltonianus* is the western form, *septentrionalis septentrionalis,* the central form, while *fasciatus* is found in the east. *Eumeces septentrionalis septentrionalis* has been reported from Canada for the first time as recently as April, 1934.

In the United States species are known from all the states except Montana and four New England states: (Vermont, Rhode Island, New Hampshire and Maine). The apparent absence from these states lends doubt to Cope's (1900) record from Nova Scotia. When more extensive herpetological collections are made in Montana, the presence of *skiltonianus* will doubtless be demonstrated. However, the likelihood of extending the range of *fasciatus* into northern New

England may be doubted, since here, it would appear, there has not been the dearth of effort in collecting as obtains in Montana.

In the United States and Canada representatives of six of the fifteen recognized groups occur, each occupying a limited region, none covering the entire territory.

The *Egregius* group occupies the most restricted territory. It is known only from peninsular Florida and the Florida Keys. A single specimen has been taken in the southern part of Georgia. The group shares this territory with three members of the *Fasciatus* group—*laticeps, inexpectatus* and *fasciatus.* This latter group is widespread, occupying the eastern half of the United States and the adjoining Canadian territory, the species being restricted in the west apparently by the reduced rainfall and consequent limitation of forests. This north-south line approximates the 97th meridian.

The *Anthracinus* group, which in a considerable measure occupies the same territory as the *Fasciatus* group, seems likewise to be limited in the west by reduced rainfall. *Anthracinus* appears to be rare (or absent) without reason from the central eastern states.

A north-south line following roughly the 93d meridian in Kansas and Oklahoma, then moving somewhat farther to the west in Texas, marks the eastern boundary of the *Obsoletus* group, represented in America by a single species, *obsoletus.* In the northern part of the range it does not reach the Rocky Mountains, but in the south it extends across Texas and New Mexico to Sonora, and north to Utah.

The *Multivirgatus* group extends from western Nebraska south through Colorado, New Mexico and Arizona, in which territory it is represented by three small species.

Approximately the western third of the United States (including the adjacent territory in Canada and extending to the tip of Baja California) is occupied by members of the *Skiltonianus* group. In this group are five forms which, while having considerable similarity in squamation of head and body, and in the young similar color patterns except on the tails, are very different in size and in the evolution of the color pattern in adults. One form of *gilberti* is apparently a high mountain form, being most common in the high Sierras in California, while the other, *rubricaudatus,* appears to be in the San Joaquin Valley and the lower ridges to the south. I would regard it as highly probable that these forms were originally separated by a water barrier and developed through isolation, but now that the water barrier has vanished, the differences may be

vanishing also. The variation that obtains between the northern *skiltonianus* and specimens occurring in the northern part of Baja California and southern California suggest that perhaps a similar condition obtained; that is, a separation of the southern territory as an island, and the consequent development of a form having the reduced interparietal inclosed by parietals. With the union of this territory to the mainland the intermingling of the forms has continued until the line of separation has become largely obliterated. *Lagunensis* in the south may have developed due to isolation by a desert barrier rather than by a water barrier.

The *Brevilineatus* group is largely Mexican in distribution, but extends into the United States in all the border states save California. These medium-sized species are apparently related to the *Fasciatus* group.

EASTERN ASIATIC FORMS

The eastern Asiatic species fall readily into three groups: the *Obsoletus* group containing *kishinouyei, chinensis chinensis,* and *chinensis pulcher;* the *Fasciatus* group containing *elegans, xanthi* and *tunganus* on the continent and *stimsonii, barbouri, oshimensis, marginatus, latiscutatus* and *okadae* on the islands of the east coast; and a third group represented by a single species, *quadrilineatus.* The first two mentioned groups have representatives in North America. The last species is confined to southeastern Asia.

The discontinuity in the distribution of the genus across Asia seems to be actual rather than merely apparent. The area occupied by the northern desert of Gobi, the Tibetan Plateau and the heavily forested regions of great rainfall in India and Burma, lacks known species. It may be that in these regions where limited herpetological exploration has been accomplished, unknown *Eumeces* await discovery, which will lessen the hiatus that separates the eastern Asiatic species from those in western Asia. The fact that the latter area is populated by members of two groups most distantly related to the eastern groups, suggests that the barrier is real and is not crossed by the genus.

The striking similarity between American and Asiatic species of the *Fasciatus* group bespeaks a close relationship—a relationship dependent no doubt upon a former continuity of the territory occupied by the group.

I regard eastern North America as the most probable place of origin of this group, and the form *fasciatus* as the most primitive of its living species (most generalized type). I do not adhere to the

postulate that would place the most primitive form farthest from point of origin in this case. It is widely distributed; occupies a variety of habitats; endures wide ranges of temperature (not of elevation) and competes with one or two derivative forms throughout a good portion of its range.

I regard migration from North America to Asia as having taken place via land bridges joining the Alaskan peninsula with Asia either at Bering Straits or via the Aleutian Island arc to Kamchatka, or both. One would need postulate but slight climatic changes, since the present climate of this coastal region is probably no more rigorous than that of southern Canada, which has three species of the genus.

I do not hold that the land bridge so built would include the Kuriles, the larger islands to the south, or the Riu Kius. The mode of speciation in these islands is linear, much as would be the case did they form a continuum with America. However, there is certain evidence which seems to preclude the above possibility.

What does seem to be the most reasonable explanation of the present distribution is that the island groups beginning with Formosa, Riu Kius, etc., were formerly a peninsula jutting from the mainland from Fukien (rather than from Korea or Kamchatka).

The following facts seem to support this postulate: 1. The genus is absent from the northernmost island group (Kuriles).

2. Two groups are present on the southern islands nearer the mainland.

3. Species of both the *Fasciatus* and *Obsoletus* groups in Formosa and Pescadores islands are so little changed that subspecific designations appear to be unwarranted.

4. There is a gradual diminution in the character of the irregular patch of scales on the posterior side of the femur, and it becomes lost in the northernmost forms.

5. The most northern Chinese species is *xanthi,* and it is more distantly related to *latiscutatus,* occurring on the northern islands, than to *elegans,* which is more southern in distribution.

The location of the sole member of the *Quadrilineatus* group (*Eumeces quadrilineatus*) in the southern part of China suggests that its relationship, if any, with the four-lined *Skiltonianus* group in America is very remote. It probably represents one of the more ancient forms of the genus, a presumption supported by the fact that only a small number of specimens are in museums, betokening an actual rarity of individuals, a rather limited distribution, and its

present isolation. In the case of all presumably ancient species the number of individuals that have been taken is relatively small; in the case of the presumed more recent species, particularly members of the *Skiltonianus* and *Fasciatus* groups, the numbers of individuals taken are large. The possibility that this is due to some other cause has not been overlooked.

AFRICAN AND WESTERN ASIATIC FORMS

A review of the localities at which species of the genus have been taken in Africa shows that the genus follows the northern coast of the continent from southwestern Morocco to the upper borders of the Red Sea, at no place reaching a distance greater than about 500 miles from the coast. This is roughly the African territory assigned to the Mediterranean Region. The limiting factor would appear to be the Sahara desert. Elsewhere members of the genus seem to have been able to adapt themselves to regions where semidesert conditions prevail, quite as well as to moist wooded regions, but none are known in true deserts.

The territory occupied seems to follow the characteristic lines mapped by Engler for the Mediterranean (botanical) Region. Schmidt (Herpetology of the Belgian Congo) has suggested that plant distribution is indeed a vital factor in determining the distribution of African animals. However, that the external physical factors limiting plant life would also directly affect animal distribution is obvious.

In western Asia the genus is limited in distribution. To the east it reaches and covers western India and approaches Tibet, but in these regions encounters barriers of three types: to the north, the deserts; in the central region, the high, cold plateau of Tibet; while in the south the tropical character of the country, with heavy rainfall, seems to prove an impassable barrier to a further extension of the range. To the south it doubtless reaches the coastline save in the region of the Arabian desert.

To the north the cause of limitation is not clear. One would expect the whole of Asia Minor, and the region south of the Caucasus Mountains to be occupied, but so far as collections go this is not true. The northern distribution farther east includes Turkestan and Eastern Turkestan (Yarkand), but I believe no records show species occurring farther north than the Aral Sea.

Two groups of the genus, *Schneiderii* and *Taeniolatus*, occur in this territory. The former is represented by several species, ex-

tending over the entire territory with the exception of the extreme northeastern part, while the *Taeniolatus* group, represented by a single species, reaches no further west than Arabia, and does not cover the entire territory occupied by the *Schneiderii* group. It does not occur on Cyprus, the eastern Mediterranean island which is occupied by a member of the *Schneiderii* group; nor does it reach Africa.

Whether the hiatus in the Asiatic distribution in the north-south central region (including Mongolia, Tibet, peninsular and eastern India, Burma, Siam and the Malay Peninsula) is real or only apparent, due to lack of collecting, can only be known after a greater amount of exploration has been done. I suspect that the Gobi desert to the north of Tibet would serve as an effective barrier on the north. I am of the opinion that the hiatus is a real one.

It appears that, despite the rather marked uniformity of the larger head scales, the *Schneiderii* group consists of five or six species rather than the three recognized by Boulenger. This is discussed under the various forms of the group.

HABITAT OF EUMECES

The finding and collecting of the species of *Eumeces* is beset with many difficulties, and for a number of reasons. For the most part these lizards are very shy, hiding underground and under rocks a good part of the day. Their movements are so snakelike and noiseless that, save for a few species, the individuals are rarely observed save by digging them out of the ground or exposing them by lifting rocks.

In many localities the number of individuals appears to be very limited, if one may judge by the number of specimens that have reached museums. Whether this rarity is actual, or is only apparent, due to the choice of habitat and time and place of feeding, I cannot state. I am inclined to regard the latter alternative rather than the former as the more probable.

The choice of habitat varies with the species, and the same species may be able to adapt itself to a variety of habitats.

Eumeces obsoletus is usually found along rocky ledges in the neighborhood of creeks and streams along which are to be found some natural growth of timber. These ledges may occur back some distance from the streams, but as long as the timber remains the species is present. When the timber is cut away, they may persist for some years. Where the timber alone is present *E. fasciatus*

may be found occasionally below fallen tree trunks and under bark of fallen trunks, or about rotting stumps where food in the form of insects and insect larvae is plentiful. In Arkansas, where I have collected, this was the more typical habitat. Farther east it is often collected in the vicinity of sawmills in and about the wood refuse.

Only rarely is this form seen in trees, at least in the western part of its range. On one occasion, in Kansas, a specimen I observed at the base of a rough-barked tree ascended the bole about twenty feet. Doctor Ortenberger has written me that during March in central Oklahoma he found an adult male in a tree, in an old bird's nest.

On the other hand, the large species *Eumeces laticeps* apparently is typically an arboreal form, being almost invariably found in trees. I believe the absence of any considerable number of young in collections is due to the fact that the small size of the young in the trees renders them more or less inconspicuous and likewise inaccessible. That both young and adults may descend to earth is attested by occasional specimens captured on the ground. The claws of this form appear to be more curved, a modification suggestive of climbing propensities.

In eastern Kansas one finds, besides *Eumeces fasciatus,* three forms: *Eumeces obsoletus, septentrionalis septentrionalis* and *anthracinus.*

The larger form, *obsoletus,* occurs most frequently on open hillsides where there are some rock exposures or scattered flat rocks. Here the species burrows in the ground and under rocks; often runways are observable when the rock is lifted. In the absence of rocks the species burrows in the open. Here they are found with greater difficulty. They are rarely seen in the open. Out of some two hundred specimens captured possibly less than half a dozen were observed in the open.

In Texas a few specimens have been dug from pack-rat burrows; one was shot from a rock in the Chisos mountains at high elevation (near extreme summit) as it issued from a rock crevice, and a specimen of *brevilineatus* was obtained a few feet away burrowed in moss.

Septentrionalis septentrionalis in eastern Kansas prefers open, grassy hillsides where small, flat rocks offer some shelter. In certain localities they appear to be numerous, but their distribution is unquestionably erratic. At Onaga, Kan., where more than one hundred specimens have been collected, they have with very few

exceptions been captured under small, flat rocks. I have observed but two moving about in the grass.

Eumeces anthracinus, another species apparently of very erratic distribution, has usually been found in eastern Kansas in the neighborhood of small streams or springs. I have observed specimens to take refuge in water when disturbed. They dive in, swim to the shallow bottom and take refuge under a plant or another object. Sometimes they swim under water to an opposite bank and slowly emerge if weeds or other cover offer protection from observation. In southeastern Kansas, near Baxter Springs, several specimens were observed moving about in the open, in sunlight, feeding on insects.

Eumeces brevilineatus is likewise quite diurnal, and a large proportion of the specimens I have taken were observed usually in the neighborhood of small streams or springs moving about during the day feeding. In the type locality (the Marnock farm near Helotes, Tex.) numerous specimens were seen running about in brush and leaves on the edge of a tiny rivulet. One specimen, previously mentioned, was taken at high elevation, 8,000 feet, on the highest peak of the Chisos mountains, and not near any surface water. It is apparent that elevation is not a pertinent factor in its distribution.

Eumeces skiltonianus likewise appears to have a wide vertical range. It occurs on the seacoast near sea level; and it also may be found up to elevations of 8,000 feet in the mountains. In company with my esteemed friend, L. M. Klauber, I captured a number of specimens in small meadows near the summit of Palomar Mountain in the northern part of San Diego county. The specimens were surprised while running about in the grass, or were found ensconsed underneath old posts or boards.

The large western form, *gilberti gilberti,* apparently is a mountain dweller exclusively, while the related *gilberti rubricaudatus* may occur in the valleys between the high Sierras and the Coast Range. Whether either of these forms is in any measure arboreal, I have not ascertained.

In southern Texas *tetragrammus,* a form closely related to *brevilineatus,* is very shy. I have never seen adults of this form moving about on the ground. All specimens I have collected were encountered while excavating in pack-rat burrows. In northern and central Texas *septentrionalis obtusirostris* was found in moist localities about gravel pits or along pond or river banks. They were not moving about, but were routed from under leaves or

collected refuse under trees or in decaying brush piles. Here they were found in company with *Leiolopisma unicolor* (Harlan) which was especially numerous, and with *Potomophis striatulus,* a small snake which occurred in some localities in almost unbelievable numbers, especially in the wet trash in the gravel pits near Waco, Tex. Two *obtusirostris* were captured at night on a log near the edge of a small pond. Both took to the water, but were captured when they emerged.

The small *egregius* is a lowland form, hiding in the coral rock. The Mexican *copei* was found in lava rock near Mexico City, and in the pine forests of western Mexico (state) under bark and slabs where logging operations were going on. Occasional specimens were taken from under rocks. *Indubitus* seems to be likewise a denizen of the pine forests, occupying habitats identical to those of *copei,* being very common where it occurs. However, I have not taken *copei* and *indubitus* in the same identical localities. They attain an elevation up to 10,000 feet and probably do not occur much below 6,000 feet.

A small form of *brevirostris* was of very frequent occurrence in a barren lava field near Totalco, Vera Cruz. The specimens were discovered under lava fragments. None were seen in the open.

North African and eastern Asiatic species are adapted to semi-desert habitats and all are terrestrial or fossorial, and confined largely to land having a relatively low elevation. *Quadrilineatus, managuae* and *schwartzei,* are probably lowland forest dwellers, but whether arboreal or terrestrial is a matter of conjecture. *Longirostris* is an inhabitant of the low, coral-bordered Bermuda Islands.

FEEDING HABITS

An examination of the stomach contents of numerous preserved specimens and specimens observed in captivity show that the food preferences are usually not strongly defined. The food consists of a very extensive variety of insects and insect larvae, Arachnida and occasionally small crustaceans. In a few specimens traces of plant material have been observed, but I regard this as being most probably of accidental introduction in the diet. Probably the most surprising fact about the diet of the forms examined is that ants are absent. I have found no specimens of this ever-present insect among the stomach contents, nor small sand grains or pebbles, the usual accompaniment of the myrmecophagous diet.

Some of the larger species, notably *obsoletus* and *laticeps,* are

known to capture and engulf small vertebrate forms. I removed the remains of a *Cnemidophorus sexlineatus* from the stomach of an Oklahoma specimen of *obsoletus*. From a captive specimen of *laticeps* I have removed a young adult *fasciatus* which it had consumed during shipment from Imboden, Ark., to Lawrence, Kan. *Obsoletus*, placed in a cage with *fasciatus*, will often kill the latter, but I have not observed any part devoured save a freshly severed portion of a tail. Hartman (1906) reports a *Crotaphytus* killed and eaten. Out of a large group of some eighty specimens of *obsoletus* kept in captivity, a considerable number learned to eat small fragments of ground beef placed about the floor of the cage. Meal worms, Orthoptera, Diptera and other insects were taken with avidity. The animal is very crafty in its movements. When a moving worm or insect is sighted the animal crouches somewhat and then moves forward craftily and noiselessly. When the victim is approached closely enough there is a sudden jerk of the head, the insect is seized and after a few chewing movements it is swallowed; usually but little attention is paid to dead or motionless insects. After being kept a short time in captivity they are quite undisturbed by one's presence, and feed with equanimity.

DEFENSE HABITS

Like many other animals, members of the genus *Eumeces*, when annoyed, react with a defense attitude that appears to be a generic attribute. In wild specimens of *Eumeces fasciatus*, a male when moving about may encounter another male. When this occurs, usually both assume a defense attitude which is evidenced by arching the back, rising, and lifting the weight to the front part of the feet as if to attain height, after a greater than normal inflation of the lungs; this may be repeated two or more times. Occasionally one, more aggressive than the other, approaches, and the other takes flight.

In captive specimens, I have observed the same activity in specimens of *obsoletus, skiltonianus* and *laticeps*.

Usually captive specimens become tolerant of the presence of others of their own or other species after a time. They even lose some of their fear of the presence of man. In tame specimens the defense attitude may be evoked if one places a hand near them. They rise on their feet to as great an extent as possible, arch their backs, move their tails slowly, inflate their lungs greatly and expel the air so forcibly that an audible hiss is evident. This latter

activity may be repeated several times while the animal remains in the same tracks; or, moving mechanically, it may change its position by slow steps, keeping the head directed toward the hand or other invading object until some distance from it has been attained. It will then run to another part of the cage. Frequently, touching or scratching the sides of the body will cause the lizard to assume the arched attitude without the hissing reaction. Sometimes a large beetle placed near a tame specimen will cause it to react and assume a "fighting" or defense attitude, accompanied by hissing.

Two males in the same cage with a female often engage in fights. Usually one is more aggressive than the other. One will seize the other by the throat or neck, perchance by a limb, and will hold tenaciously as the other tries to escape. If the one attempting to escape is held by the tail, as is often the case, that member is frequently severed due to the frantic efforts of the captive to escape.

When large snakes are placed in cages the skinks appear to avoid the intruders. Occasionally a small snake, such as *Carphophis* or *Diadophis,* is seized and held, the bite resulting in the death of the snake.

BREEDING HABITS AND LIFE HISTORY

Obsoletus breeds quite readily in captivity. I have observed the courtship of the form on several occasions. When my presence was noted by the skinks the courtship usually ceased. The male maneuvers so as to bring his body alongside that of the female, and then rubs his body against the sides of the quiescent female. The latter frequently responds by a pressure of her body against that of the male. Occasionally a male follows a female about the cage, the female moving slowly ahead, the movements somewhat tensed and mechanical. Several times males were observed holding onto the tails of the females or dragging them by the tail about the floor of the cage. If the female became impatient and escaped she was followed and again seized by the male.

Hobart Smith (*in litt.*) describes the position of copulation as follows: "The male was on the left side of the female, which was in the normal position on the bottom of the cage. The male had the head and forepart of the body partly across the body of the female, holding on to a portion of loose skin on the side of the female's neck with his jaws. The male's tail was crooked about under the tail of the female at right angles to the latter, the ventral surface of the tail turned somewhat forward, but not turned a com-

plete revolution. One hemipenis was inserted. Vibratory movements were quite noticeable in the male. They were in this position when discovered, and were observed for three minutes and twenty seconds after which time they separated."

Sexual activity has not been observed by me in other species kept in captivity; however, *fasciatus* and *septentrionalis* do so breed, since fertile eggs have been laid by captive females of these forms in my vivarium. The time ensuing after copulation before deposition of the eggs has not been recorded in the oviparous forms.

Ovoviviparity has developed only in certain Mexican forms of the *Lynxe* and *Brevirostris* groups. It is known in *Eumeces lynxe, brevirostris* and *dugesii*. The first record which I can find is that of Duges,* who, writing of *Eumeces dugesii* Thominot, states, "Si se puede juzgar por una observation única, los creo vivíparos: los chiquitos nacen con un resto de vitellus colgando de su cordon umbilical y el amnios arrollado á modo de cintura en la region sacra."

Hartweg (Copeia, 1931, p. 61) records ovoviviparity in *Eumeces lynxe*. His material consisted of a single female, containing six young, measuring from 44 mm. to 46 mm. in length. Hartweg describes the position of the young in the uterus and body cavity, not being aware that this distribution was due to the fact that in my examination of the specimen I had removed certain of the embryos for study of size and coloration, and that they had not been returned to their original position in the uterus. It would appear that the young were nearly ready to be born, as practically no yolk matter remained attached to them. Originally, all were in the uteri and none free in the body cavity.

One specimen in the United States National Museum (No. 30213, *Eumeces brevirostris*) contains a series of four developing embryos. The specimen is in a poor state of preservation, and the yolk material has disintegrated so that none of the embryos is attached to the yolk membranes. The embryos are about 30 mm. in length. The uterine walls are rotted so the young appear to be loose in the coelom. They show, as yet, no color save the eye pigment.

Still another specimen of the same species (U.S.N.M. No. 30089) shows the presence of four embryos, but here, as in No. 30213, the yolk material and the uterus have disintegrated and four small embryos, about 26 mm. in length, appear to be free in the body cavity in a semiliquid yolk.

These data seem to prove conclusively that *Eumeces dugesii,*

* La Naturaleza (1), VI, 1882-1884, p. 362.

lynxe and *brevirostris* are normally ovoviviparous. None of the species in the United States, Asia or Africa have as yet been found to be ovoviviparous.

This condition in America is paralleled in the genus *Sceloporus*. Few of the species occurring in the United States appear to bring their young forth alive, while many Mexican species are known to do so.

The condition of both oviparity and ovoviviparity is likewise typical of certain other genera of the Scincidae, notably *Mabuya* and *Leiolopisma*, species of which, in the same locality, may exhibit both conditions. *Leiolopisma pulchellum pulchellum* is oviparous, *Leiolopisma semperi,* ovoviviparous; *Mabuya multicarinata,* oviparous, *Mabuya multifasciatus,* ovoviviparous, in the Philippines. The latter two species occur in the same localities.

The oviparous species usually deposit their eggs in moist earth beneath logs or rocks of sufficient thickness to protect the eggs from too great heat from the sun. The eggs are usually not completely covered with earth. It was found in the case of eggs laid by *Eumeces septentrionalis septentrionalis* in captivity that if the eggs were completely covered by moist earth they invariably rotted. If only partially covered, they developed quite normally.

The eggs of *Eumeces fasciatus, laticeps* and *obsoletus* are at least in some measure incubated by the skink. The body is placed about the clutch and this position is maintained at least for the greater part of the time the eggs are incubating. This characteristic has been observed in *obsoletus* in the case of a female in Oklahoma which was brooding a clutch of ten eggs. This is the only clutch of this species I have found.

Captive specimens deposited the eggs in loose earth beneath rocks. The eggs which were removed as soon as found to other incubating grounds were apparently never brooded, at least not immediately after they were laid.

Noble and Mason (1932) give an excellent account of the brooding habits of *fasciatus* and *laticeps*.

GROWTH

The growth pattern of the various species and subspecies of the genus *Eumeces* appears, so far as investigation has gone, to be of a very stable nature and characteristic of the species. Throughout the range of a species the data show a variation in maximum size of but a few millimeters and this should diminish with a larger number of individuals available for measurement.

I am of the opinion that occasional cases of gigantism may appear, as is true of many other organisms, but I have not observed it in this genus. The supposed great local differences in size in *fasciatus* and *skiltonianus* of many authors is due to the failure to discern that two or more distinct species were involved.

The taxonomist should not overlook the fact that a change in a gene producing a form whose maximum bulk is three or four times that of the parent stock is quite as "specific" as one that produces a postnasal or splits a postmental. I consider maximum size and the growth pattern a pertinent part of the definition of a species. However, the necessary description can only be written when a very considerable amount of material has been subjected to careful scrutiny, and careful data recorded. Data on the snout to vent measurement were recorded for most of the individuals of all the species I have had available. Data so taken, when plotted, show the individuals falling into groups which I interpret as representing age groups. This is particularly true of those forms that live in a territory where a well-marked winter season occurs which produces hibernation. The same may be true in regions where distinct wet and dry seasons occur. The majority of specimens collected in the United States were obtained during the months of April, May and June. Those taken in other months were greatly in the minority, although specimens were examined that had been collected each month in the year.

As a check on the sum total of the data from specimens of a species taken at various times of the year and in numerous localities, I plotted the measurements of a series of individuals taken at the same time of the year (May) and in the same locality. The measurements thus taken fall into the various groups as shown in the total data and approach the average size for the data groups. When two or three such series check in this manner, it lends much weight to the postulate that these groups are age groups. When data for the two sexes are plotted, the numbers representing meas-

urements for the adult females are usually a millimeter or two larger than those for the males.

As the total amount of such data is very great, it is not feasible to publish it here. However, the following table shows a summary of the growth data for five species. It is obvious that the figures may be made more accurate with large series from single localities, but I believe the averages are not far from the expected size for any given year of life.

Growth table for species of *Eumeces*

Year	*1st**	*2d*	*3d*	*4th*	*5th*	*6th*	*7th*	*8th*	*9th*
fasciatus	27.5	33.6	40.9	48.1	52.2	56.9	60.3	62.7	65.7
laticeps	35	44.2	53.5	60	66	76	85	90	96
inexpectatus	28	33	42.2	48.2	54	57.5	60.1	63.2	66
skiltonianus	26	32.4	39	45.3	50	54.5	58.2	61.7	63.8
g. gilberti	32	40	46	51	60.5	68	74.6	80	85.8

Year	*10th*	*11th*	*12th*	*13th*	*14th*	*15th*	*16th*	*17th*	*18th*
fasciatus	68.3	70	72.3	74.9	77	....	....	80	....
laticeps	100.3	105.5	110	114	117.5	....	....	....	124
inexpectatus	69	71.4	74.3	77	....	83	....	....	....
skiltonianus	66.4	69	70.3	72	....	....	75	....	....
g. gilberti	90	95.2	100	....	....	106	....	....	113

* In September; other years June.

SPECIATION AND MODE OF EVOLUTION

The species which I believe represent the more ancient members of the genus belong to the *Schneiderii, Schwartzei, Taeniolatus, Longirostris, Obsoletus, Egregius* and *Quadrilineatus* groups. These are so regarded largely because each is now isolated from its most closely related group. The *Taeniolatus, Longirostris* and *Quadrilineatus* groups are monotypic, the last two widely separated from their nearest living relatives. There may be some doubt whether *Taeniolatus* is more closely related to the *Schneiderii* group or to the *Schwartzei* group. I am inclined to regard the former as the nearer relative.

The *Schwartzei* group has three forms, all apparently very strongly differentiated, while the *Schneiderii* group has six forms, all lacking strong differential characters. By reason of this the latter is presumably the more recently developed stock of the above-listed groups. I regard it quite probable that the genus originated in Asia, later spreading to America and Africa. The stock of the four- and five-lined groups appears to be for the most part of much more recent development, so regarded largely because they are contiguous at some point with a related group; they appear plastic and as yet show less specialization from the generalized ancestral type. I regard the modern five-lined skinks of the genus in eastern

Asia as having been derived from American forms, since the members all belong to one group, and all are quite closely related to each other, as well as to the American forms of their group, and all with a minimum of specialization.

The American forms have differentiated to a much greater extent, suggesting a longer sojourn in their present similar environment. It is possible, but not certain, that the four-lined group originated in southeastern Asia, and has spread to North America.

The island derivatives of *Eumeces elegans* show less modifications from the parent species than one usually regards as specific. However, I prefer to use specific rather than subspecific names for forms on isolated island groups which are definable and which cannot intermingle with other similar populations.

Inasmuch as the criterion of what constitutes a namable form is constantly changing, it seems probable that when the reptiles have been studied with the same amount of material as mammals, we will doubtless see far more named varieties than I have regarded it wise to recognize at this time. It seems quite likely that at least certain forms of *E. skiltonianus, laticeps, brevirostris* and *multivirgatus* will be separated on the basis of variants already known.

There are no strong trends in this group toward specialization of the limbs, as is evidenced in several genera of the skinks, such as *Brachymeles* and *Chalcides,* and which appear to be due to orthogenic evolution; nor trends such as one finds in *Mabuya* and *Tropidophorus* toward modification of the scales with strong keels and spines. Single scales may become modified along orthogenic lines (lateral postanal), and occasionally groups of scales (fusion of the dorsal rows). Striation of dorsal scales has appeared in two remote groups. Variation that obtains appears to be more sporadic; and similar variations from the generalized type are brought about by fusion (or dropping out) of elements or by the breaking up of elements. There is a tendency for both dwarf and giant forms to appear. Habitation of small islands has not had very great effect on size, or at least no very consistent effect. *Longirostris,* on the Bermuda Islands, is a relatively large form. *Kishinouyei,* a small-island species, is very large and equally as large as its related continental species. *Barbouri,* however, likewise an island form, is the smallest member of its group. On the other hand, *egregius, dicei, parvulus* and *parviauriculatus,* all continental species, have become dwarfed in a variety of habitats. There seems to be no environmental factor in common stimulating the development of large size in *laticeps* and *gilberti.*

The number of scale rows bears no consistent relation to size. True, most of the smaller species have fewer rows than their related larger species. However, the number of scales is as much reduced in certain members of the *Schwartzei* and *Schneiderii* groups, certain members of which attain a size greater than any other members of the genus.

SEXUAL DIMORPHISM

No striking general sexual dimorphism is evident in squamation in *Eumeces*. However, in many species the sex may be determined on the basis of special scales and color characters. In adult males the proximal ventral portion of the tail is somewhat fuller and more rounded due to the presence of the hemipenes. In a number of species, notably certain Asiatic members of the *Fasciatus* group, a lateral postanal scale is strongly modified. This is true to a lesser extent in members of the *Obsoletus* and *Skiltonianus* groups. In these Asiatic forms of the *Fasciatus* group the scale bears a strong, well-defined keel which is wanting or dimly evident in the females. In the *Obsoletus* group the scale is somewhat enlarged and mound-like, often bearing less pigment than the adjoining scales. The scale in several other groups is more or less modified in the males, but the difference is usually much less evident.

As a general rule, in forms in which there is color dimorphism, the female tends to retain the juvenile coloration, or, if this is lost, it is lost at a time later than in the male. In most, if not all, of the members of the *Sumichrasti, Fasciatus, Longirostris* and certain of the *Skiltonianus* and *Obsoletus* groups, the juvenile lined pattern becomes dim and in older males finally lost completely, while more or less of the lined pattern is retained by the oldest females. An exception to the latter rule obtains in *Eumeces gilberti gilberti* and *gilberti rubricaudatus*. In these forms the females take on quite faithfully the same color and markings as the males (except the reddened head), but do so two or three years (sometimes more) later than males of equal age.

Old males of the four groups mentioned above usually have the temporal region more or less inflated, often quite abnormally distorted, apparently reaching the greatest development in *Eumeces laticeps*.

During the breeding season males of many species display a reddish coloration on the head and sides of the neck and chin. This varies greatly in shade and intensity in various species, likewise in

individuals of the same species. Sometimes this red coloration is more or less permanent on the heads of the males. I have not observed it on the heads of the females.

The body length of adult females (axilla to groin) is proportionally longer than in males, at least in proportion to the length of the limbs. Thus, the adpressed limbs of females overlap less or are separated by a greater distance than in the males.

In females distended with eggs or young, the scales, due to the stretching of the skin, appear to be somewhat larger than in the males.

CONSIDERATION AND EVALUATION OF SPECIFIC CHARACTERS USED IN DESCRIPTIONS

Data listed in the descriptions may be in a measure misleading unless the significance and variability that may be anticipated is considered; hence the following discussion of characters.

ROSTRAL. The rostral reaches to the top of the snout a greater or lesser distance, and the area of the part seen from a dorsal view is usually a constant character. In the drawings, due to foreshortening, the part visible may appear less than the description states. When there appears to be a variation in the relative size of the visible part of the rostral and the frontonasal, it is due to variation in the size of the latter scale.

NASAL. The nasal scale is in most species of *Eumeces* divided by sutural grooves which emerge from the anterior edge of the nostril and continue to the upper edge of the scale, and from the lower anterior edge of the nostril, continuing to the rostral or first labial. The nasal scale may be shed singly or may break at the suture; if together it usually may be separated by a touch. Sometimes the scale lacks the suture, no or only a slight depression marking the position of the suture, and the scale does not break at this point. The latter is the expected condition in *E. septentrionalis septentrionalis*.

Normally the posterior part of the nasal carries the part of the scale flooring the nostril; the anterior part, only the anterior turned down rim. When a postnasal is not present, there is usually a small area of the scale behind the nostril; when present, the posterior part is narrow, forming merely a rim about the posterior part of the nostril. I presume that the normal postnasal is formed chiefly from the nasal, although its position may occasionally suggest a derivation from the first loreal. Occasionally the anterior loreal

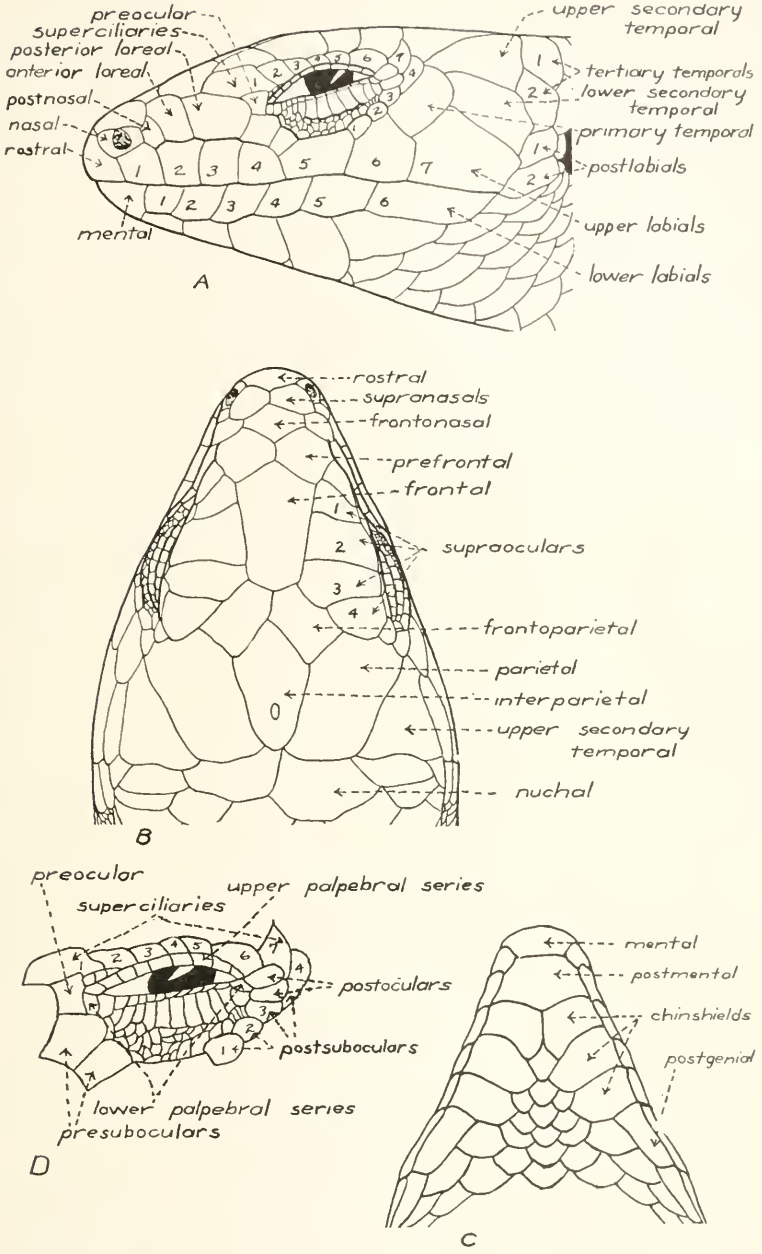


FIG. 4. Head plates of *Eumeces*. A, lateral view of head; B, dorsal view of head; C, ventral surface of head; D, region of eye.

may be segmented transversely in forms where no postnasal occurs, and gives the impression that a postnasal is present. That this is not the case is evident by noting that in such cases the upper part of the loreal is separated from the labials—a condition that does not normally occur in any species, but does occur frequently in *E. latiscutatus.*

POSTNASAL. This scale is relatively constant when present, and in species where it is normally absent, rarely appears. However, in *multivirgatus,* a species in which the scale may be regarded as normally present, it is absent on one or both sides in about 10 percent of the specimens. One may, however, expect occasional exceptions to the general rule in practically all species. The variation is likewise great in *E. obsoletus,* being absent in the south, but present in numerous northern specimens.

SUPRANASALS. Constancy of size and relation to adjoining scales is the normal expectation as regards the supranasals. They are usually in contact, separating the rostral from the frontonasal; however, the supranasals may separate, and in the case of *E. septentrionalis septentrionalis* this condition occurs in more than 20 percent of the material examined. In forms having a variable frontonasal the size of the prefrontals rather than the supranasals is usually affected. This separation of the supranasals occurs only rarely in other species and normally occurs in none.

PREFRONTALS. These scales, differing in size and shape in various species, are likewise quite variable within most species, and in some species it is difficult to say whether the normal condition is to have the scales forming a median suture (separating frontal and frontonasal) or to have them separated, leaving the frontal and frontonasal in contact. In *Eumeces laticeps,* one may definitely say that the prefrontals are normally in contact, being separate in less than one percent of the specimens. *E. fasciatus,* on the other hand, has these scales extremely variable, reaching 78 percent separate in certain localities, and as low as 5 percent in other localities. When in contact the scales are usually distinctly larger than when separated, and the shape of the posterior part of the frontonasal and of the anterior angle of the frontal is likewise modified.

FRONTAL. The general shape and the relative width and length of the frontal are only moderately constant, since the separation of the prefrontals usually causes a greater length. A rare anomaly is the transverse segmentation of the scale. This I have found occur-

ring in at least ten species. The type of *E. lynxe furcirostris* shows this division, but it is doubtless merely an anomalous condition. Many species may occasionally show small portions segmented from the posterior part of the scale. Anomalies have been observed in several species which permit the frontal to touch the interparietal; in *E. taeniolatus* this is presumably the normal condition.

INTERPARIETAL. In very young specimens this scale is almost invariably proportionally larger and more prominent than in the adults. Apparently the actual shape of the scale may change as the specimen grows older. In most species the scale is separated from the frontal (see above paragraph) and is in contact posteriorly with the nuchals. In a few species the normal condition is for the interparietal to be separated from the nuchals by a union of the parietals. This is true of several Mexican species, and the transitional condition is evident in *E. skiltonianus* in the extreme southern part of California, where a considerable precentage of the specimens shows this condition, which apparently becomes the normal relationship in Baja California.

SUPRAOCULARS. The number of supraoculars is uniformly four throughout the greater part of the genus and anomalies producing more or less are rare. In *E. dugesii, E. lynxe furcirostris* and *E. egregius,* however, three is the normal number. In most descriptions of *E. taeniolatus, algeriensis* and *schneiderii,* the number is usually given as five; this is due to the fact that the small vertical scale terminating the superciliary series has become greatly enlarged and has been rated as a supraocular, while the same scale, invariably present in other known species, is considered the terminal superciliary. To be consistent the scale must be interpreted the same throughout the genus—all having five (four in *egregius,* etc.) or none having five. I choose the latter interpretation.

SUPERCILIARIES. The number of superciliaries is quite variable, but in general character they are constant for a given species. The posterior ones of the series tend to segment or fuse (as the case may be). The expectation is for the anterior one to be in contact with the prefrontal and only rarely does it fail to be so. Normally, too, it is separated from contact with the frontal, but occasionally they may touch. The last two of the series are normally in contact, but occasionally the last (vertical) one may be separated from the preceding one by the fourth supraocular; or a small postocular may intervene. This latter condition is typical in *E. egregius.*

The median superciliaries are in contact in most species with the upper palpebral scales bordering the edge of the eyelid, while the anterior and posterior ones are separated from the palpebrals by small granules. In some forms, however, practically all the palpebrals are in contact with the superciliaries (*E. schwartzei*), while in the *Schneiderii* group all are separated by one or more rows of granules, thus permitting greater movement of and giving greater area to the upper eyelid.

PRESUBOCULARS. This term is applied to the small scales lying between the anterior corner of the eye, the labials and the posterior loreal. Two is the usual number (rarely, anomalously, one or three). In *E. schwartzei, altamirani* and *managuae,* however, the normal number appears to be three.

POSTSUBOCULARS. A series of small scales bordering the lower posterior edge of the orbit separating the temporals and labials from that part of the orbit is so designated. The scales of this series are usually variable in different species. In *E. obsoletus* this series and the presubocular series may actually appear continuous, due to a slight enlargement and the presence of darker pigment in the small, light-colored, opaque scales of the lower eyelid. An anomalous condition due to segmentation of a portion or portions of the subocular labial may produce this same continuation between the two groups (observed in *E. laticeps*). The continuity of the presuboculars and postsuboculars is normal in certain African and western Asiatic species.

TEMPORALS. The group of scales occupying the temporal region is somewhat difficult of interpretation and heretofore the terminology has not been adequate for accurate description. However, these scales must be considered as important and as pertinent to a description of a species as any other scales on the head. The number of these scales varies somewhat with the species. Four is the normal expectation. The most anterior may be considered as the primary temporal, and is usually small, single and normally present save in *E. egregius, E. dicci* and possibly *colimensis;* the next (posterior) are termed the secondary temporals. These are two usually, the upper one bordering the parietal; the other just below it, is the lower secondary, which is in contact with the primary save in a few species where it may be separated from it leaving the upper secondary in contact with the last labial. In this case the scale may be pushed back or may be interpreted as wanting. The tertiary temporal (occasionally divided) is usually a vertically

elongate scale bordering the upper secondary temporal and extending down behind the lower secondary. The temporals for any given species may be regarded as constant as most of the other head scales and in many species may be diagnostic. In *E. ochoterenae* there is considerable variation in the relation of the last labial and the upper secondary temporal; very rarely is this variable in *skiltonianus*.

PARIETALS. These scales, due to their great irregularity of shape, are somewhat difficult to describe to bring out specific characters, yet differences are usually in evidence on a comparison of two species. Usually their relationship, whether in contact or separated, is diagnostic; an exception is *Eumeces brevirostris* as here interpreted.

LOREALS. Two loreals are present, an anterior and a posterior, the former of which is usually vertically elongate and higher than the latter. The length of the posterior is usually greater than its vertical height. However, in certain species the anterior reaches no higher than the posterior, and is a constant character.

Boulenger *et al.* have regarded the large scale following the nasal in *taeniolatus* (*scutatus* Boulenger) as being a third loreal. I interpret this as a postnasal.

The posterior loreal is occasionally found with a posterior segment (vertically segmented usually), while the anterior is found occasionally transversely segmented (frequently in *E. multivirgatus* and *E. septentrionalis septentrionalis*).

PREOCULAR. This is a small scale lying between the first superciliary, the posterior loreal, and the presubocular, against which the anterior palpebrals of the upper and lower lids abut. It is followed, above the palpebrals, by one or more granules diminishing in size, or by a continuous series across the lid, as in African forms.

POSTOCULARS. A pair of small scales lying at the posterior corner of the eye, inclosing partially the posterior palpebral of both upper and lower lids, is so designated. The upper may enlarge to such a size that it breaks the continuity of the superciliary series.

SCALES OF LOWER EYELID. Practically all species show an enlarged series of opaque or semitransparent scales lacking pigment other than white, which are in contact with the lower palpebral scales. These are usually vertically elongate, rectangular, and diminish in size from the center. Neither their number nor their size is constant. These are separated from the pre- and postsuboculars

and the subocular by from one to four rows of very small scales which are usually flat, and either juxtaposed or imbricating. The number of rows is usually fairly constant for the species. In certain forms of the *Schneiderii* group the enlarged scales may be in two series, reduced greatly in size.

UPPER LABIALS. This series is considered as terminating with a large scale whose posterior edge lies some distance in front of the ear and is separated from the ear by one scale, a pair of scales, or in some cases, several (four or five) pairs. In some published descriptions these small scales are counted as labials, and, where only a single scale appears, it is quite similar to those of the labial series, and may actually partially border the corner of the mouth. For the sake of uniformity the last labial counted is the large scale, invariably the second following the subocular labial; the scales following are regarded as postlabial or preauricular scales. The general characters of the labials are diagnostic in many cases.

The anterior part of the series (three, four or five) may be variable in many species; for instance, five is the usual number in *E. laticeps* and only rarely are four present; four is the normal number for *E. fasciatus,* but the number five appears rather frequently. In *E. egregius,* rarely also in *E. anthracinus,* the number may be reduced to three. The relative height and the length of the labials, perhaps more especially of the subocular, are relatively constant for a species.

LOWER LABIALS. This series of scales is likewise variable in number, and the count is made from the mental to the largest elongate scale which appears to terminate the series, but which may be followed by one or more smaller scales, concealed below the large (last) upper labial.

MENTAL. The scale for a given species usually is constant as to the extent of its labial border and its depth.

POSTMENTAL. The mental is followed by either a large, single, undivided scale, or by two scales formed by a transverse division of the large single scale. In most species one or the other of these conditions is constant save for an occasional exception. However, in *E. fasciatus,* where the normal expectation throughout the greater part of the range is two postmentals, occasional individuals may be found with a single, undivided postmental, and in the extreme southwestern part of the range (Oklahoma), this condition may be present in 40 percent of the individuals.

CHINSHIELDS. There is a very remarkable constancy in the general relation of the chinshields following the postmentals; these consist of three pairs of scales, the first strongly in contact medially (rarely not); the second pair separated by a single small scale; and the third pair separated usually by three scales. In *E. egregius* there are only two pairs of chinshields normally present.

POSTGENIAL. I use this name to describe the elongate scale bordering the lower labials posterior to the last (third) chinshield. This scale is usually constant, and in the greater number of the species is bordered on its inner edge by an elongate scale shaped somewhat similar to the postgenial, though smaller, and which likewise borders the posterior edge of the third chinshield. This scale, in certain Mexican species, is very different, and appears as a broad scale, distinctly of greater diameter transversely than longitudinally, and is constant for the species. This condition obtains also in certain African forms. However, the elongate scale rarely may fuse with the postgenial, resulting in a wider postgenial, which is then bordered by the adjoining scale which is wider than long. This fusion has probably brought about the condition in the Mexican species. In *Eumeces skiltonianus* the fusion takes place occasionally.

SCALE ROWS. The variation in the number of scale rows is considerable, and it varies at various parts of the body. Thus, in the region behind the ear, there is a postauricular series of four or five vertical rows which are sharply set off from a series of lateral neck scales by their smaller size, and by a definite line denoting a different direction of the scale rows. This series of neck scales is then set off posteriorly from the suprabrachial lateral shoulder scales by another line usually running up from the anterior point of insertion of the forelimb onto the shoulder (usually diagonally).

Posterior to the insertion of the arm in the axilla is an area, small in some forms, larger in others, with tiny granular scales, which may also border the arm insertion dorsally; behind this there is a radial series of scales, running upward and backward, which usually continue diagonally a distance equal to the length of the forelimb and sometimes farther. These are, however, somewhat irregular in their point of termination and occasionally one terminating normally anteriorly will be continued to the groin, thereby increasing the scale count at the middle of the body. Sometimes the intercalated rows may terminate near the middle and a count one or two scales farther forward may vary the count by two rows.

The greater number of species vary considerably so that in some species a variation of as many as eight scales may occur in the counts; and they may vary as much as six scales in a group of specimens from a single locality. However, this is greater than is usual and a variation of two rows is the more normal expectation. The number of scale rows about the base of the tail is fairly constant and is usually very different in most species from the number about the body. In some forms the number may be nearly the same (counts should be made from the first widened subcaudal). In the region posterior to the insertion of the hind limb there are in most American, Mexican and eastern Asiatic forms, no granular scales. In the African and western Asiatic species there is usually a considerable area in this region covered by tiny, nonimbricating scales. When the limb is laid back on the side of the tail a pocket-like depression is formed along the side of the anal region.

In most species the scales on the side of the body form parallel longitudinal rows. In two forms, *E. longirostris* and *E. obsoletus*, the normal condition is to have well-defined diagonal rows on the sides of the body. However, in the latter species, in the extreme southwestern part of the range, the scales may be parallel on the sides in some of the specimens. In all species the scales in the axilla form diagonal rows.

In certain of the western Asiatic, Mexican and Central American species the two median rows appear to unite, forming a single median row for a part of the distance on the back; in the African forms the two median series are much widened, but never unite to form a single median series.

In many species, on the dorsal surface of the neck following the nuchals, the scales are wider than the succeeding scales, and in the *Taeniolatus* and *Schwartzei* groups, where several pairs of nuchals are present, the succeeding widened scales between the nuchals and the median widened series have been likewise called (erroneously) nuchals in the descriptions of certain authors.

In numerous species the termination of a lateral row is marked by one or two considerably enlarged scales; the ventral scales on the breast, too, are usually very considerably enlarged.

PREANALS. The anterior edge of the anus is usually bordered by six or eight scales. These consist of a median, frequently somewhat thickened pair, more or less greatly enlarged, with two or three scales on each side, diminishing in size. In the *Taeniolatus*,

Schwartzei and *Schneiderii* groups, the inner scales overlap the edges of the outer pairs. In all other species the outer scales overlap the edges of the inner, except in *longirostris*, in which the second outer overlaps the median as well as the adjoining scale.

LATERAL POSTANAL. In the males of most species there is present a more or less differentiated scale lying at the posterior lateral border of the anus. In certain eastern Asiatic species the scale bears a flattened spine or keel. The scale, however, in most species is larger and may have a slight convexity or increased thickness. The scale is prominent in *E. obsoletus*, and to a lesser extent in the species of the *Skiltonianus* group occurring in California. It is probable that a glandular area is present under the scale. In several species the sexes can be determined by this character, since it is undifferentiated or less differentiated in the female than in the male.

SUBCAUDALS. The width of the subcaudal scales in relation to that of the adjoining rows is a constant character and very little variation has been noted. When the tail is regenerated, the character of these scales changes and in species where the subcaudal scales are not widened in the original tail, they may become greatly widened in the regenerated part (true especially in *Eumeces inexpectatus*). The number of subcaudals varies somewhat, but within a relatively small range.

SCALE PITS. The scales on the sides of the posterior part of head, the scales of the sides of neck, body and base of tail and the scales on upper arm and leg are usually pitted with two or more small pits near the posterior part of the scale. These may be rounded or set in a short distance from the posterior edge of the scale or may form a groove to the posterior edge. Often there are more than the typical two on scales of side of neck and body while invariably the scales in the posthumeral and postfemoral regions have more than two.

The head scales likewise show evidence of pitting, but this is often not evident. Only a few forms have the dorsal scales pitted. The pitting is less distinct, occasionally quite obsolete, in old adults.

COLOR DESCRIPTION. The names median, dorsolateral and lateral light lines are self-explanatory. The sublateral usually is very low on the side, and when present is never conspicuous. Usually it disappears before any other line.

SECONDARY LINES OF COLOR PATTERN. The young are nearly always quite dark, black-brown, or actually black, a color that

changes in intensity even during the first year, the tendency being for the pigment to segregate towards the sides of the scales (less frequently to the posterior part of the scale), thus leaving contrasting lines in the ground color. These light and dark lines are referred to as secondary, and when present never have the clean-cut distinctness of those forming the primary color pattern (*multivirgatus*). Sometimes, too, the darker pigment on the head will tend to arrange itself so as to appear to form the "bifurcating" head lines. These are always less distinct than when these form a part of the primary pattern.

* KEY TO THE SPECIES OF EUMECES WIEGMANN

(NOTE.—A key is only an *aid* in identifying specimens, and should never be the final criterion for determining a species. The key presented here will identify most known forms of the genus, provided all characters of a specimen fall within the normal expectation for the species to which it belongs. Where a variation is frequent the species may appear more than once in the key. Species which lose their typical (juvenile) markings may likewise appear in more than one place in the key.

A. Median preanal scales in turn overlap outer preanal scales. (African, western Asiatic, Central American and southern Mexican species.)

B. Scales of the single median dorsal series greatly widened; scale rows about middle usually in odd numbers; usually four or five pairs of nuchals, followed by paired median scales for a short distance; no (or only a very small) area of granular scales posterior to the insertion of hind limb; lower suture in nasal from nostril to first labial; presubocular and postsubocular series not continuous.

C. Frontal and interparietal in contact; heel without greatly enlarged plates or pads; terminal lamellae of digits not tightly bound about base of claws; two presuboculars; median palpebral scales separated from the superciliary series by small granules; four pairs of postlabials; two postmentals; 19–21 scale rows; four supraoculars; toes and fingers with only a dorsal and a ventral series of scales for the greater part of their length. (Southeastern Asia) ..... *Eumeces taeniolatus* (Blyth), 111

CC. Frontal and interparietal separated by the frontoparietals; plates on heels much enlarged; terminal lamellae of digits tightly bound about base of claws; three presuboculars; most of upper palpebral scales in contact with superciliaries; one postmental scale; two pairs of postlabials between last labial and ear; toes and fingers with a dorsal, ventral and a lateral (on each side) series of scales.

D. Series of three broad black stripes beginning at rostral continue some distance on the anterior part of body; these break up posteriorly into quadrangular black spots, forming indefinite lines; tail with quadrangular black spots above; subcaudals immaculate; ground color gray-brown or gray-olive; 24 scale rows; 60–63 scales from parietals to above anus. (Southeastern Mexico and Guatemala.) *Eumeces schwartzei* Fischer, 94

DD. No broad black stripes beginning at rostral.

E. Subcaudals spotted; above sepia or bistre; median scale row with two dark lines from head to tail; adjoining rows with continuous dark lines or lines of dark spots; scales from parietals to above anus, 67–69; 17 scale rows about body. (Nicaragua.) *Eumeces managuae* Dunn, 104

EE. Subcaudals unspotted; generally light yellow brown; occipital and nuchal region lighter; above numerous small dots of dark brown not forming distinct lines; a broad lateral band of brown on sides; 59 scales from parietal to above anus; scales in 19 rows. (Michoacan, Mexico) ..... *Eumeces altamirani* Duges, 102

BB. Two median series of dorsal scales wider than adjoining rows; a well-defined area of small granular scales behind insertion of the hind leg, the skin forming an ill-defined pocket when the limbs are moved back; scales round the body normally in even numbers of rows, all much wider than long; upper palpebral scales separated from superciliaries by one or more series of small granular scales; lower suture in nasal (if present) from nostril to rostral; presuboocular and postsubocular series usually continuous; four or five nuchals.

* *Eumeces skiltonianus brevipes* Cope has been inadvertently omitted from the key. (This agrees with the typical form, but is larger, has a somewhat longer head, the scales more glazed in appearance, and the tail is usually lavender in color.

C. No lateral, light-colored line present.

D. Generally light brown above with transverse light or orange markings, alternating with transverse lines of ocellated (red) spots; large cream spots on posterior labials and sides of neck; immaculate cream on under surfaces; four pairs of nuchals; 28–30 scale rows about middle of body; 8–9 upper labials; scales of back and sides striated; those on belly dimly striated; no postnasal; four auricular lobules. (Northwestern Africa) ..... *Eumeces algeriensis algeriensis* (Peters), 146

DD. Allied to preceding, but with the median subocular scales elongated, narrow; first superciliary scarcely visible from above, slightly smaller than first supraocular; three lobules on anterior border of ear; 1 pair of nuchals. (Ain Sefra, Algeria.)
Eumeces algeriensis meridionalis Domergue, 152

CC. A lateral white line present (occasionally somewhat indistinct).

D. Olive-brown above with a pattern of very narrow cream lines formed of narrow elongated dots on each scale row; slender. (Egypt and western Asia) ..... *Eumeces pavimentatus* (Geoffroy-St. Hillaire), 133

DD. Lacking a pattern of very narrow longitudinal dotted lines.

E. Nearly uniform gray, gray-olive or golden olive above (dull blackish brown when preserved), white below. (Egypt and western Asia) ..... *Eumeces princeps* (Eichwald), 138

EE. Dorsal coloration not uniform.

F. Nearly uniform brown, or brown or olive with a series of quadrangular spots, forming usually two or more broken lines, more rarely with transverse rows formed from same spots. Sometimes dim indications of a dorsolateral lighter line; scales of median pair of rows greatly widened; usually four auricular lobules; scale rows, usually 24. (Cyprus, Egypt, north Africa Eastern Asia) ..... *Eumeces schneiderii* (Daudin), 126

FF. Allied to the preceding but hind feet longer (the torso scarcely 2-2⅓ times the length of the hind feet); first loreal longer, the height scarcely one and one half times length; shorter frontonasals; the nostril above anterior third of the first labial; five or six auricular lobules; scales in 26 rows; scales of the four median rows enlarged. (Seistan and Kirman, Persia.)
Eumeces zarudnyi Nikolsky, 142

AA. Medial preanal scales overlapped by adjoining scale; scales of the two median dorsal series occasionally larger, but usually not or but little larger than adjoining scales, except that those following nuchals may be somewhat more widened; no pocket or area of small granular scales posterior to insertion of hind limb; normally two presuboculars. Size and markings variable, but usually two or more longitudinal light lines present in young (*E. humilis, obsoletus* and some *tunganus* excepted) and blue or orange color on tail. Usually two (very rarely three) pairs of nuchals; the lower nasal suture, if present, reaching first labial; presubocular and postsubocular series never normally continuous; at least a part of the upper palpebral scales in direct contact with the supercilliary series (except *humilis*). (American, Mexican and eastern Asiatic forms.)

B. Supraoculars three.

C. Normally two pairs of chinshields; scales bordering ear anteriorly overlap opening; supercilliary series broken by a small postocular; three or four labials anterior to the subocular labials; tails orange in young and adult; small species.

D. Dorsolateral and lateral lines continuous to some distance on the tail, the dorsolateral lines separated by two whole and two half scale rows; the lateral separated from dorsolateral by two whole rows and two half rows; the median pair of scale rows much larger than adjoining rows. (Eastern and southern Florida, and Islands) ..... *Eumeces egregius egregius* (Baird), 490

DD. Dorsolateral and lateral light lines wider, usually distinct only anteriorly, the dorsolateral light line occupying part of two scale rows and, if continuous, following middle of third scale row, separated by four whole and two half rows. Lateral light line, if continuous, separated from the dorsolateral by one whole and two half rows of scales; the median dorsal scale rows only slightly larger than adjacent rows. (Florida) ..... *Eumeces egregius onocrepis* (Cope), 497

CC. Normally three pairs of chinshields.

D. Median light line from scapular region to middle of frontal where it bifurcates, each part running forward to frontal; dorsolateral and lateral light lines extend to tail in young; the lateral may become shortened or obsolete in old specimens; scale rows, 22-24; max. size, 54 mm. (The States of Hidalgo, Puebla and Vera Cruz in Mexico) ..... *Eumeces lynxe furcirostris* (Cope), 173

DD. No median light line or bifurcating lines on head; dorsolateral and lateral light lines more or less distinct anteriorly, growing dim or obsolete posteriorly; 24 scale rows; max. size, 67 mm. (Guanajuato and Michoacan in Mexico) ..... *Eumeces dugesii* Thominot, 472

BB. Supraoculars, normally four.

C. Scales on sides of body forming diagonal rows from axilla to groin.

D. Each outer preanal scale in turn overlaps the next inner; young, black with a white dot on each head scale; tail azure; adults variable in markings, either nearly uniform olive or olive with varied lines of darker color; one (or no) postnasal; two postmentals; one pair of small nuchals; scales rows, 26–28; max. size, 125 mm. (Specimens from New Mexico and Arizona sometimes with scales parallel on sides.) (Central and southwestern United States and northern Mexico) ..... *Eumeces obsoletus* (Baird and Girard), 305

DD. Preanal scale, adjoining the enlarged median pair of preanals, overlaps the medial scale and the adjoining outer scale; scales small, in 32–38 rows; a four-lined pattern in young, lost in adult males; occasionally a sublateral line present in young; limbs long, overlapping widely when adpressed; max. size, 80 mm.; postnasal present; one postmental; one pair of large nuchals. (Bermuda Islands.)

Eumeces longirostris (Cope), 155

CC. Scales on sides of body in parallel rows save in axillary region.

D. White or cream lines, varying in length, present on body, the light lines tending toward olive or brown in older specimens; and a broad lateral brown stripe. (Except in *humilis* and *tunganus*, which are without lines.)

E. One postmental.

F. Postnasal present.

G. No keeled lateral postanal scute.

H. Rather small species, uniformly colored; lacking a definite brown lateral stripe and all white lines on body in young or adult; adults bronze or olive-bronze; palpebral scales separated from the superciliaries by a row of granules (or very nearly so); subcaudals only slightly widened; scales from parietals to above anus, 61-63; one or two postlabials; 24–26 scale rows; max. size, snout to vent, 73 mm. (New Mexico, western Texas and northwestern Mexico) ..... *Eumeces humilis* Boulenger, 358

HH. Young always with at least five whitish lines, retained or lost in adults, but when lost, usually a lateral brown stripe more or less evident; scale rows, 26–30 round middle of body; the median light line bifurcating on nuchal; max. size, 80 mm. snout to vent; two rather large superimposed postlabials; palpebrals largely in contact with supereiliaries; subcaudals distinctly widened; scales from parietals to above anus, 53–62. (Eastern half of United States, and eastern half of southern Canada.) ..... *Eumeces fasciatus* (Linnaeus), 188

GG. A keeled lateral postanal scute.

H. Scale rows, 22; the median white line bifurcating on the nuchal; no well-defined patch of irregular enlarged scales on posterior surface of femur; two pairs of nuchals; max. size, 66 mm. (Amamioshima, Riu Kiu Islands.) *Eumeces barbouri* Van Denburgh, 265

HH. Scale rows, 24 or more; no well-defined patch of enlarged irregular scales on posterior surface of femur; anterior loreal variable, sometimes transversely divided.

I. Scale rows, 28, rarely 30; five-lined pattern, the median line not bifurcating on head, the pattern more or less retained in adults; max. size, 79 mm. (Idzu Islands, Japan) ..... *Eumeces okadae* (Stejneger), 272

II. Scale rows, 26, rarely 24; usually one pair nuchals; five-lined form; the median line bifurcates on the nuchal; pattern usually lost in adults; maximum snout to vent measurement, 80 mm. (Larger Japanese Islands.) *Eumeces latiscutatus* (Hallowell), 276

FF. Postnasal absent.

G. A well-defined keeled lateral postanal scale present, less distinct in females; upper secondary temporal widened, emarginate behind; lower secondary with nearly parallel sides.

H. A well-defined patch of enlarged irregular scales on posterior side of femur; the median light line bifurcating on the nuchal; scales 26–28 rows; max. size, 93 mm. (Southern China, Formosa and Pescadores Islands.) *Eumeces elegans* Boulenger, 245

HH. No well-defined patch of irregular scales on posterior side of femur.

I. Smaller, seven-lined form, the median line bifurcating on nuchals; markings more or less lost in adult males; lateral line passing above ear; scale rows, 24–26; max. size, 63 mm. (Yaeyama Group, Riu Kiu Islands.) *Eumeces stimsonii* Thompson, 260

II. Larger; five-lined form, the lateral light line passing through ear; no sublateral light line.

J. Median series of scales usually more or less distinctly widened; the white lines on body extend on tail, one-half to three-fourths its length; the dorsolateral line follows middle of the third scale row; scales in 26 rows; max. size, 93 mm. (Okinawa, Riu Kiu Islands) ..... *Eumeces marginatus* (Hallowell), 267

JJ. Median series of scales usually not or scarcely widened; light lines extend less than one third the length of tail; dorsolateral line passes along edges of the third and fourth scale rows; usually 28 scale rows; max. size, 99 mm. (Amamioshima and Kikaigashima, Riu Kiu Islands, Japan.) ***Eumeces oshimensis*** Thompson, 253

GG. No keeled lateral postanal scute; upper secondary temporal not greatly widened or emarginate.

H. Young and adult without white lines on body or a lateral brown stripe; the palpebral scales separated from supereiliaries by a row of granules. (New Mexico and northwestern Mexico)..... *Eumeces humilis* Boulenger, 358

HH. Young with white stripes on body varying in length, more or less retained in adults of most species.

I. Median line present or at least the "bifurcating" lines on the head present in young, lost, sometimes, in old adults.

J. Median line extending to tail, anteriorly bifurcating on the posterior part of frontal; limbs large, broadly overlapping in adults; scale rows, 28–30; postgenial bordered by a scale longer than wide; max. size, 96 mm. (Southeastern Mexico to Honduras)..... *Eumeces sumichrasti* (Cope), 178

JJ. Median line not extending to tail, reaching the shoulder only.

K. Median line bifurcating on anterior part of frontal; limbs small, widely separated in adults; frequently, dotted dark lines on dorsal scales; scales, 22-26 rows, usually 24; max. size, 70 mm.; scales under tail moderately widened. (Central and eastern Mexico.)

Eumeces lynxe lynxe (Wiegmann), 163

KK. Median line very short (or wanting), bifurcating on the nuchal; scales under tail not or but little widened.

L. Dorsolateral and lateral lines continuous to tail; usually 28 scale rows; three pairs of nuchals; the "bifurcating lines" never actually join posteriorly, the median line completely lost; other light lines dim or obsolete in older specimens; scales under tail not or but little widened; max. size, snout to vent, 71 mm. (Southern Texas and northeastern Mexico.)

Eumeces tetragrammus (Baird), 298

LL. Dorsolateral and lateral lines short, reaching about half way on body; usually two pairs of nuchals; median line bifurcating on nuchals; 26, rarely 28, scale rows; max. size, 66 mm. (Southern Texas and northern Mexico)..... *Eumeces brevilineatus* Cope, 283

II. No trace of a typical median white line or lines on median part of head.

J. Primary temporal absent, the last labial broadly in contact with the large upper secondary temporal.

K. Small species; lower secondary temporal wanting; 22–24 scale rows; parietals not inclosing the interparietal; twelve lamellae under fourth toe; dorsolateral lines extend to tail, separated by six rows; lateral line to ear; legs short, widely separate when adpressed (18 scale lengths); prefrontals in contact; max. size, 47 mm.; only type known. (Northeastern Mexico.)

Eumeces dicei Ruthven and Gaige, 482

KK. Larger species; lower secondary temporal present; limbs elongate, broadly overlapping when adpressed; prefrontals separated; broad dorsolateral lines continue to tail, separated by eight scale rows; max. size, 69 mm.; 28 scale rows; parietals enclosing interparietal; 16 lamellae under fourth toe. (Colima, Mexico) ..... *Eumeces colimensis* Taylor, 478

JJ. Primary temporal present; lower secondary temporal present.

K. Seventh labial not in contact with the upper secondary temporal.

L. Parietals do not enclose interparietal; two pairs of nuchals.

M. Very small species; scale rows, 20; prefrontals separated; ear opening minute, partially covered by a scale; size, 47 mm. (Western Mexico.)
Eumeces parviauriculatus Taylor, 368

MM. Larger forms; max. size, above 65 mm.; scale rows, more than 20.

N. Four dorsal scale rows widened, each scale row usually with a continuous line of dark dots (rarely absent); dorsolateral line from first superciliary; postgenial bordered by a scale broader than long; primary temporal larger than lower secondary; max. size, 76 mm.; limbs widely separated in adults; scales in 22–24 rows. (S. Mexico) ..... *Eumeces copei* Taylor, 387

NN. Dorsal scale rows not or scarcely widened; no lines of well-defined dots on scales, except occasionally on tail; dorsolateral lines from last supraoculars to tail, separated by four or more scale rows; limbs well-developed, overlapping or touching save in females distended with eggs; 24–28, usually 26 or 28 scale rows; postgenial bordered by a scale longer than broad; primary temporal smaller than lower secondary; max. size, 70 mm. (Eastern U. S. to Kansas and Oklahoma) ..... *Eumeces anthracinus* (Baird), 373

LL. Parietals enclose interparietal; 24 scale rows; two pairs of nuchals; six superciliaries; primary temporal very large, equaling the upper secondary temporal in size; dorsolateral line lost on back; lateral line reaches ear; max. size, 51 mm. (West Mexico.)
Eumeces parvulus Taylor, 363

KK. Seventh labial in contact with the upper secondary temporal (except in certain *ochoterenae*, in which case the parietals are not enclosed); primary temporal small.

L. Dorsolateral lines broad, separated by less than four scale rows, occupying outer two thirds of second scale row and inner half of third, extending on proximal third of tail; a lateral line to arm; bluish color of tail retained more or less in adults; 22 scale rows, rarely 24; two pairs of nuchals; 54 scales from occiput to above anus; parietals do not enclose interparietal; body slender; max. size, 56 mm. (Guerrero, Mexico.)
Eumeces ochoterenae Taylor, 485

LL. Dorsolateral lines narrower, unless short, but if extending to tail, follow the third scale row.

M. Larger, robust forms; 22–24 scale rows; parietals enclosing interparietal; dorsolateral line short, reaching shoulder; lateral line terminates at ear; scales occiput to above anus 55–57; max. size, 66 mm. (Central southern Mexico). *Eumeces indubitus* Taylor, 466

MM. Usually smaller, less robust forms; the dorsolateral line longer or shorter; the lateral line more or less distinct on side or stopping in front of ear; the parietal enclosing interparietal or not; scales occiput to above anus, 57–63; max. size, 70 mm. (Mexican Plateau) ..... *Eumeces brevirostris* (Gunther), 459

EE. Two postmentals present.

F. Postnasal present.

G. Last labial broadly in contact with upper secondary temporal; parietals enclose interparietal; four-lined pattern, extending to tail; tertiary and lower secondary temporal present; tail orange or pink in young, the color lost in adult; 24 scale rows; max. size, 60 mm. (Baja California, Mexico) ..... *Eumeces lagunensis* Van Denburgh, 431

GG. Last labial not in contact with upper secondary temporal.

H. Parietals enclose interparietal.

I. Four-lined pattern; no median line or bifurcating lines on head.

J. Median scale rows widened; scales large, in 20 rows; three pairs of nuchals; limbs elongate, overlapping distinctly when adpressed; subcaudals widened; max. size, 73 mm. (Southern China and Indo-China.) *Eumeces quadrilineatus* (Blyth), 452

JJ. Median scale rows not or but slightly widened; scales in 24-26 rows; limbs barely touching or slightly overlapping; subcaudals widened distinctly; max. size, 80 mm.; two pairs of nuchals. (California and Baja California. In other parts of range parietals not enclosed.) *Eumeces skiltonianus skiltonianus* (Baird and Girard), 415

II. Five-lined pattern, the median line short, bifurcating on nuchals; usually 28, rarely 26, scale rows; subcaudals slightly widened; limbs fail to touch when adpressed even in young; dorsolateral and lateral lines may become obsolete in adults; the dorsolateral lines separated by six scale rows; max. size, 65 mm. (Southwestern U. S. and northwestern Mexico) ..... *Eumeces callicephalus* Bocourt, 290

HH. Parietals do not enclose interparietal.

I. A well-defined keeled lateral postanal scale, less prominent in females; well-defined patch of irregular enlarged scales on posterior face of femur; upper secondary temporal not fanshaped, but with the upper and lower sides nearly parallel, rounded behind; lower secondary temporal nearly fanshaped; 22–24 scale rows; max. size, 76 mm. (China) ..... *Eumeces xanthi* Gunther, 239

II. No keeled lateral postanal scale.

J. Typical five-lined pattern, the median line bifurcating on the nuchal.

K. Scales under tail not or but very little widened; young usually with a sublateral line; seven or eight labials; 28–30 scale rows; max. size, 80 mm. (Southeastern U. S.)

Eumeces inexpectatus Taylor, 224

KK. Scales under tail very distinctly widened.

L. A patch of enlarged, irregular scales on posterior part of femoral region; upper secondary temporal more or less triangular, emarginate behind, notched below; lower secondary with sides nearly parallel; max. size, 81 mm.; 28 scale rows; 64 scales from parietal to above anus; limbs overlapping when adpressed. (Central western China.) (Some young specimens as well as adult may wholly lack the five-lined pattern.)

Eumeces tunganus Stejneger, 234

LL. No patch of enlarged, irregular scales on the posterior part of femoral region; upper secondary temporal elongate, not emarginate or notched below.

M. Large species, head greatly widened in old males.

N. Scale rows, 30–32; lateral line continuous; in eastern specimens a sublateral line present; usually one small postlabial (frequently not touching lower secondary temporal), sometimes two small postlabials when the tertiary temporal and last labial are not in contact; scales not striated; aboreal; intercalated scales on fourth toe extend to base of penultimate phalanx; max. size, 120 mm. (Southeastern U. S. to Pennsylvania to northeastern Oklahoma.)

Eumeces laticeps (Schneider), 212

NN. Scale rows 24–26; lateral line broken somewhat anteriorly; scales more or less striated, marks lost in adult males; a pair of postlabials touching lower secondary temporal; intercalated scales on fourth toe on basal phalanx only; max. size, 164 mm. (Southern Riu Kiu Islands.)

Eumeces kishinouyei Stejneger, 334

MM. Smaller species, head not greatly widened in adults; lateral line extends to tail; scale rows, 26–30, usually 28; two rather large superimposed postlabials; intercalated scale series on fourth toe extends but little beyond basal phalanx; max. size, 80 mm. (Entire eastern U. S. to Dakota and Texas, southern Canada.)

Eumeces fasciatus (Linnaeus), 188

JJ Body with four-lined pattern (lost in adults of some species). No bifurcating lines on head.

K. A lateral and dorsolateral line; the latter extend to tail and are separated by equivalent of three or less scale rows (usually two whole rows and two half rows).

L. Lines persistent in adults; tails blue in young; max. size, under 90 mm.; scale rows, 24–28, usually 26; 59 scales from parietals to above anus. (Northwestern and western U. S. to Baja California. In southern part of range the parietal is enclosed.)
Eumeces skiltonianus skiltonianus (Baird and Girard), 415

LL. Lines disappearing in adults.

M. Young blue tailed; body losing stripes in early life; old specimens bluish green to olive-green, often with red head; larger; max. size 113 mm.; scale rows, 24–26. (Sierra Nevada, Cal.) ..... *Eumeces gilberti gilberti* Van Denburgh, 438

MM. Young pink- or red-tailed; body losing stripes in early life; max. size, 101 mm.; 24–26 scale rows. (California and Baja Cal.) *Eumeces gilberti rubricaudus* subsp. nov., 446

KK. Dorsolateral lines separated by at least four scale rows.

L. No secondary pattern of black and light lines; scale rows, 24; max. size, 66 mm. (New Mexico, Texas) ..... *Eumeces gaigei* Taylor, 353

LL. A well-developed secondary pattern of dark lines on back bordering the primary white lines and secondary light lines; the median secondary line widened and apparently bifurcating on head; 24–25 scale rows; max. size, 65 mm. (Nebraska, Wyoming to Texas.)
Eumeces multivirgatus (Hallowell), 341

FF. Postnasal absent.

G. Limbs elongate, overlapping when adpressed in young, separated in adults; large forms; max. size, more than 115 mm.

H. Three (normally) supraoculars touch frontal; six (normally) upper labials present; adult females retain juvenile five-lined color pattern. (North central China) ..... *Eumeces chinensis pulcher* (Dumeril and Bibron), 328

HH. Two (normally) supraoculars touch frontal; dorsolateral line broken, with other scattered spots above and below it; normally seven upper labials; adult females do not (or to a lesser extent) retain juvenile pattern. (Southern central China.) ..... *Eumeces chinensis chinensis* (Gray), 320

GG. Limbs short, failing to touch in adults, when adpressed; medium-sized forms; max. size, less than 80 mm.

H. Median line short, or, long, bifurcating on the nuchals, or if lost, the lines on head present; dorsolateral and lateral light lines extend to tail; the dorsolateral lines separated by six scale rows; median line short or wanting.

I. Parietals enclose interparietal. (Arizona and northwestern Mexico.) ..... *Eumeces callicephalus* Bocourt, 290

II. Parietals do not enclose interparietal. (Southern Texas and northeastern Mexico.)
Eumeces tetragrammus (Baird), 298

HH. Median line absent or developed secondarily, but when present not bifurcating on head.
I. No trace of median line or secondary darker or lighter lines; the dorsolateral lines complete to tail, separated by four scale rows; 24 scale rows; 66 scales from parietal to above anus; lateral line not reaching ear. (New Mexico, western Texas) ..... *Eumeces gaigei* Taylor, 353

II. Dorsolateral and lateral lines narrow, typical; frequently a secondary median light line evident, usually with secondary dark lines on back; lateral line passes above ear.
J. The frontonasal small, not or rarely in contact with the anterior loreals, often wanting; secondary pattern of dark lines usually evident; average 60 scales from parietal to above anus; 28 scale rows; max. size, 75 mm. (Central U. S. from Canada to southern Kansas.)
Eumeces septentrionalis septentrionalis (Baird), 394

JJ. Frontonasal large, in contact with anterior loreals; secondary pattern less well-developed; scales from parietal to above anus average 57; usually 28 scale rows; max. size, 74 mm. (Okla., Texas.)
Eumeces septentrionalis obtusirostris (Bocourt), 405

DD. Body without white or cream lines on head or body; frequently a distinct lateral brown stripe or only a trace of a lateral brown stripe; occasionally secondarily developed dark lines on back continuous or dotted, or each scale with a darker area. (Adults of species given previously, usually males, rarely females. It is possible old specimens of some of the other species may lose all trace of the white lines; however, only those are included in which this loss has been observed.)
E. Two postmentals.
F. Postnasal not present.
G. Medium sized species; 28 scale rows; usually three pairs of nuchals; sometimes one postmental; scales under tail not greatly widened; max. size, 71 mm. (Southern Texas and northeastern Mexico) ..... *Eumeces tetragrammus* (Baird), 298

GG. Large species, maximum size more than 115 mm.
H. Normally three supraoculars touch frontal; normally six upper labials. (North central China.)
Eumeces chinensis pulcher (Dumeril and Bibron), 328

HH. Normally two supraoculars touch frontal; normally seven upper labials. (Southern central China.)
Eumeces chinensis chinensis (Gray), 320

FF. Postnasal present.
G. A patch of enlarged irregular scales on posterior part of femur; upper secondary temporal more or less triangular, widened behind and emarginate, notched below; 28 scale rows. (Central western China) ..... *Eumeces tunganus* Stejneger, 234

GG. No patch of enlarged irregular scales on the posterior part of femur.
H. Subcaudals not or but slightly wider than adjoining scales. (Southeastern U. S.) . . . *Eumeces inexpectatus* Taylor, 224

HH. Scales under tail very distinctly widened.
I. Limbs broadly overlapping when adpressed.
J. Smaller species; max. size, 80 mm.; 26–30 (usually 28) scale rows; head not greatly widened. (Eastern half of United States) . . . . . *Eumeces fasciatus* (Linnaeus), 188

JJ. Larger forms, more than 80 mm. max. size.
K. Scale rows, 24–26; scales more or less striated; head not greatly widened. (Southern Riu Kiu Islands) . . . . . *Eumeces kishinouyei* Stejneger, 334

KK. Scale rows, 30–32; head greatly widened, red in color (yellowish when preserved); scales not striated. (Southeastern U. S.) . . . . . *Eumeces laticeps* (Schneider), 212

II. Limbs barely touching or failing considerably to touch when adpressed.
J. Adults, males and females, with blue-green or brown-olive coloration, the head of males red. (Sierra Nevada, east to Nevada) . . . . . *Eumeces gilberti gilberti* Van Denburgh, 438

JJ. Adults, males and females, usually olive, the males not developing a red head. (San Joaquin Valley and south to Baja California) . . . . . *Eumeces gilberti rubricaudus* subsp. nov., 446

EE. One postmental.
F. Postnasal present.
G. Scale rows, 22. (Amamioshima, Riu Kiu Islands) . . . . . *Eumeces barbouri* Van Denburgh, 265

GG. Scale rows, 24 or more.
H. Palpebral scales separated from supereiliaries by a row of granules; subcaudals only slightly widened. (New Mexico, Texas and northwestern Mexico) . . . . . *Eumeces humilis* Boulenger, 358

HH. A part of the palpebral scales in contact with supereiliaries; subcaudals distinctly widened. (Oriental forms.)
I. Scale rows, 28, rarely 30. (Idzu Islands, Japan) . . . . . *Eumeces okadae* (Stejneger), 272

II. Scale rows, 26, rarely 24. (Larger Japanese Islands) . . . . . *Eumeces latiscutatus* (Hallowell), 276

FF. Postnasal absent.
G. Upper secondary temporal widened (more or less triangular), emarginate behind; a well-defined keeled lateral postanal scale.
H. A well-defined patch of irregular enlarged scales on posterior side of femur; scales, 26–28 rows; max. size, 93 mm. (Southern China, Formosa and Pescadores Islands) . . . . . *Eumeces elegans* Boulenger, 245

HH. No well-defined patch of enlarged irregular scales on posterior side of femur (occasionally a slight irregularity).

I. Smaller; max. size, 63 mm.; scale rows, 24–26. (Yaeyama group, Riu Kiu Islands.)

Eumeces stimsonii Thompson, 260

II. Larger; max. size, above 90 mm.

J. Scales in 26 rows; median pair of rows somewhat widened. (Okinawajima, Riu Kiu Islands.)

Eumeces marginatus (Hallowell), 267

JJ. Scales in 28 rows, the median usually not or scarcely widened. (Amamioshima and Kikaigashima, Riu Kiu Islands) ..... *Eumeces oshimensis* Thompson, 253

GG. Upper secondary temporal elongate, not triangular or emarginate behind; no keeled lateral postanal scale.

II. Scale rows, usually 24; limbs small, widely separated. (Central and eastern Mexico.)

Eumeces lynxe lynxe (Wiegmann), 163

HH. Scale rows 28 or more.

I. Subcaudals much widened; limbs large, broadly overlapping. (Southeastern Mexico to Honduras.)

Eumeces sumichrasti (Cope), 178

II. Subcaudals only slightly widened; limbs fail to touch, or overlap but slightly. (Southern Texas and northeastern Mexico) ..... *Eumeces tetragrammus* (Baird), 298

TAXONOMIC CONSIDERATIONS

SCHWARTZEI GROUP

This group may be characterized as follows: The division between auricular scales and the lateral neck scales prominent, directed backwards; line separating neck and suprabrachial scales is anterior to arm insertion; postgenial scales posterior to third chinshield, bordering labials, not well differentiated; three presuboculars, separated from postsuboculars; upper eyelid reduced, the superciliary and palpebral scales in contact; lower eyelid with three rows of scales.

Terminal pair of lamellae tightly drawn about base of claw; a few small tubercular axillary scales; median preanal scales overlap lateral preanals; scales preceding preanals more or less modified; enlarged heel pads; no small tubercular scales behind insertion of the hind leg. Scales in axillary region and behind the hind limb, on sides of tail, also on the posterior side of arm and hind limb and the region behind ear, very strongly pitted with tiny elongate pits or grooves on the extreme posterior edges of scales; pitting only dimly visible elsewhere, save in postauricular region; four or five pairs of nuchals, followed by several paired scales which in turn are followed by greatly widened median plates on back. The third supraocular is widely separated from the frontal, the frontoparietal touching second supraocular; ear lobules prominent, distinct, rounded, all strongly in contact. Three anterior superciliaries widened and elongate, diagonally placed. Broadened subcaudals preceded by four paired scales. Regenerated tail has greatly widened scales above as well as below, separated from each other by five, two or one row of lateral scales, depending upon the point where regeneration is begun.

Three species, all large (120 mm. snout to vent), are considered as belonging to this group, which is confined to the southern part of Mexico and the northern part of Central America. I am considerably in doubt about their closest relationship. They resemble *taeniolatus* of India and western Asia, in the broadened median series of dorsal scales and general plan of markings, but they differ from it in numerous other characters of equal import, so that it is not impossible that the two groups arrived at this character independently.

KEY TO THE SPECIES OF THE SCHWARTZEI GROUP

PAGE

A. Limbs widely separated when adpressed. General color above light brownish with eight dark, narrow dotted lines on back. Scales in 17 rows about body; 67–69 scales in a row from parietals to above anus ..... *Eumeces managuae* Dunn, 104

AA. Limbs more elongate, touching or barely failing to meet when adpressed.

B. Color olive-bistre, lighter anteriorly; three broad, dark stripes, a median and two lateral, beginning on rostral, continue on back and sides where they break up into series of quadrangular spots; a light line on side of head. Scale rows 21. Scales occiput to above anus, 62–63 ..... *Eumeces schwartzei* Fischer, 94

BB. Light yellow brown, lacking broad stripes anteriorly; occipital and nuchal region without markings: scales, with small dark dots, in 19 rows. Scales occiput to above anus 59 ..... *Eumeces altamirani* Duges, 102

Eumeces schwartzei Fischer

(Plate 1; Figs. 5, 6)

SYNONYMY

1884. *Eumeces schwartzei* Fischer. Abh. Nat. Ver. Hamburg, VIII, 1884, p. 3, pl. VII, fig. 1 (type description; type locality, Island in Laguna de Términos, Bay of Campeche [Mexico]); Günther, Biol. Cent. Amer., 1885, Oct., p. 33 (spelled *schwartzii;* reference to type description): Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 382 (data from type description; spelled *schwartzii*); Cope, Proc. Amer. Philos. Soc., XXII, Jan. to Oct., 1885, p. 170 (key characters; spelled *schwarzei*); Cope, Bull. U. S. Nat. Mus. No. 32, 1887, p. 46; Boulenger, Proc. Zoöl. Soc. London, 1894, p. 725 (lists a specimen from the West Indies from Christiania Museum; spelled *schwartzii*); Shattuck, the Peninsula of Yucatan, Carnegie, 1933, App. A, p. 575 (spelled *schwartzii*); Stuart, Occ. Papers, Mus. Zoöl., Univ. Mich., No. 292, June 29, 1934, pp. 13, 14.

History. The type specimen from "einer kleinen Insel in der Laguna de Términos (Campeche Bai)" reached Hamburg, Germany, apparently as a stowaway in a cargo of dyewood. When captured it was sent to the Zoological Garden in Hamburg, and later, at its death, to the Naturhistorische Museum. When described by Fisher (1884), it was named in honor of E. W. E. Schwartze, an officer of the Zoologische Gesellschaft in Hamburg.

The type description is a good one and is accompanied by a figure in black and white showing scale characters and markings, together with some smaller line figures. As regards scale proportions and finer details these are inaccurate.

The species has remained a great rarity in collections. A single specimen in the British Museum is labeled "West Indies," doubtlessly an incorrect locality. A single specimen is in the University of Michigan collection (No. 68226, Chichen-Itzá, Yucatán, Mex.), three in the U.S.N.M. (Nos. 71380, 71409 and 71948), all from Guatemala, and two in Harvard from Yucatán and Guatemala have been available for study.

Dugès' species *Eumeces altamirani,* described in 1891 from "las regiones cálidas del Estado de Michoacán," seems to be a close relative of *Eumeces schwartzei,* while the recently described *man-*

aguae Dunn is more distantly related. Dugès, at the time he described his species, was unaware of the description of this species by Fischer, as was Dunn unaware of the Dugès species when he described *managuae*. Dugès figures are notoriously poor in detail, and the true relationships are hard to determine. My examination of the type of *altamirani*, while not wholly satisfactory, causes me to retain it as a distinct species.

Diagnosis. Eumeces schwartzei is a large species of the genus, characterized by the presence of a postnasal, a single postmental, two supraoculars touching the frontal, four or five pairs of very broad nuchals, followed by about ten pairs of scales somewhat narrower than the nuchals, which in turn are followed by a broadened median series of scutes about five times as broad as deep. A broad, median, dark stripe beginning on snout is lost on the back; a broad lateral dark band from snout to hind leg; this is not of solid color posteriorly, but breaks up into rows of quadrangular spots; beginning on the tip of the snout, a lighter line of ground color follows the canthus, the supraocular region and along the side of the back where it becomes widened and lost; toes and fingers with four complete series of scales throughout their length.

Description of species. [Drawn from three specimens from the United States National Museum: 71380 Chuntuquí, Petén, Guatemala; 71409 and 71948, Remate, Petén, Guatemala.] Rostral wider than high, the part visible above relatively small, more or less rounded behind, not forming a median angle; supranasals large, forming a broad median suture, laterally in contact with the nasal and postnasal, the posterior suture with the first loreal greater than that with the frontonasal. Frontonasal large, longer than its distance from the end of the snout, touching laterally the first loreal and the prefrontal, narrowly touching the frontal posteriorly; prefrontals more or less quadrangular, forming subequal sutures with the two loreals, the first supereiliary and the first supraocular, narrowly separated from each other; frontal about once and three fourths as long as broad, not forming sharp angles at either end, touching laterally the two anterior supraoculars; between the frontal and supraoculars is a very distinct groove which continues back onto the frontoparietals; frontoparietals small, forming a broad median suture, touching laterally three supraoculars; interparietal scarcely larger than a frontoparietal but usually more elongated (enclosed by parietals in U.S.N.M. No. 71948 and separated very narrowly in U.S.N.M. No. 71380); parietals diagonally placed, four-

sided, the ends of equal width, the inner side very much longer than outer.

Nostril directly above the labio-rostral suture, pierced between the two parts of the nasal scale; the posterior part narrow, forming the very narrow rim and floor of the nostril, the anterior moiety about one third the size of the postnasal; postnasal relatively large, sometimes approaching the size of the combined area (including nostril) of the two nasals, usually extending as high and its lowest point inserted slightly between upper edges of the first two labials, broadly in contact with the supranasal; anterior loreal very high,

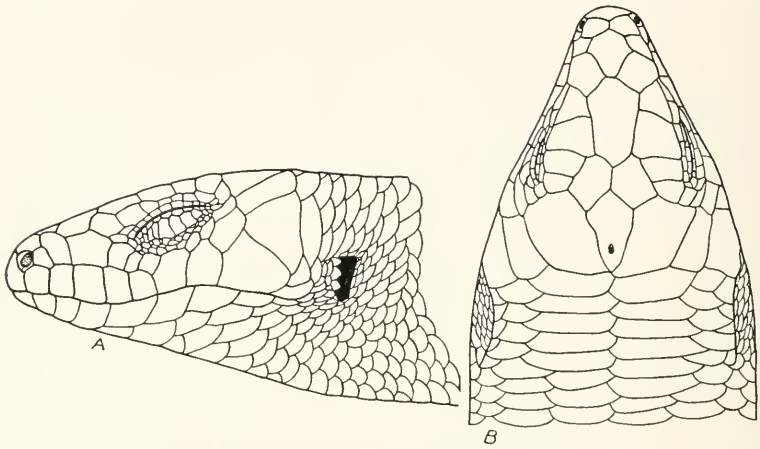


FIG. 5. *Eumeces schwartzei* Fischer. Mich. U. No. 68226. Chichen-Itzá, Yucatán. A, lateral view of head; B, dorsal view of head. Actual head length, 17.6 mm.; width, 16 mm.

extending nearly half its height beyond the posterior loreal; the latter is longer than high, the elevation anteriorly greater than posteriorly; three well-defined subequal anterior suboculars follow the second loreal; four supraoculars; eight superciliaries; four posterior suboculars; four or five semitransparent enlarged scales on lower eyelid, separated from subocular by three or four rows of small scales; upper palpebral series forming sutures its entire length with the superciliaries; 9 upper and 11 lower palpebrals; preocular small, lanceolate, separating the first presubocular from the first supercilliary, and followed by two small scales; eight upper labials, the last very much the largest, the fifth smallest; eighth separated from the ear lobules by three or four pairs of postlabials, the anterior largest; primary temporal moderate, rectangular; upper secondary narrow, elongate; lower secondary very large, triangular,

touching primary; tertiary temporal separated from upper secondary by a scale, and from the ear lobules by two or three small postlabials.

Mental followed by a single, unpaired postmental; six enlarged lower labials, the first two touching the postmental; three pairs of enlarged chinshields, the first pair in contact, the second pair separated by a single scale, the third pair by three scales; no well-defined postgenial, the scales following third chinshield scarcely distinguishable from body scales in two specimens; in a third there is an elongate, narrow scale following, which reaches to near angle of the mouth.

The number of scale rows varies on the neck just posterior to the ear, from 33 to 36; shortly in front of the foreleg the count reaches as low as 26; the count about abdomen is 21. The dorsal series following the parietals consists of a series of four to five greatly widened nuchals, six or seven times as wide as deep, the anterior usually not as wide as but deeper than the succeeding scales; these are followed by ten or eleven pairs of scales about four times as wide as deep, which continue to a point on a level with the insertion of limbs; from here the dorsal surface is covered by a single median series of broadened scales four to five times as wide as deep, which continue to a point as far back as the groin. Total count from occiput to above anus is 60-63; scales on tail not differentiated save on underside where they are distinctly widened, their posterior edges strongly curved; the widened series separated from vent by five paired scales; 11 scales about base of tail at beginning of widened series; lateral body scales vertically elongate, larger than ventral scales; rows of scales following the insertion of forearm small, forming somewhat diagonal rows for a short distance, but on sides they form series distinctly parallel to dorsal scales. Scales in the postauricular region very small, the number around ear opening 21-23; three auricular lobules, directed back; the scale following the eighth upper labial is somewhat enlarged, with a superimposed scale, the two separated from ear by a second pair; 14 scales about the arm near insertion and about 20 scales around hind limb just above point of insertion; six scales bordering anal flap, the two median only moderately enlarged and overlapping outer; no differentiated lateral postanal scute at corners of vent in either sex; a strongly defined, large, padlike wrist tubercle; the palm has about 13 enlarged scales with numerous intercalated smaller ones; the lamellar formula of fingers: 6; 10; 12; 11; 9; the heel is bordered

by five scales, the two median largest, the inner more than twice as large as outer; these preceded by about 10 enlarged, rounded scales intermingled with smaller ones; the lamellar formula of toes: 7; 11; 14; 16; 11; lamellae smooth; toes encased by four longitudinal rows of scales, the terminal ones bound about claws. Scales elaborately pitted, each lateral and dorsal scale with numerous elongated pits near the posterior border.

Body rather heavy, elongate, with the limbs strong, well developed; the adpressed limbs of adults not or but scarcely meeting on the sides of the body; the average width of the body contained about five and one half times in snout to vent measurement. Head moderately slender, not conspicuously widened in males, the eye relatively small, its greatest diameter contained about two and one half times in its distance from the tip of the snout.

Color and markings. Above, the general ground color is a variegated olive-bistre, slightly clearer anteriorly and probably approaching cream in life; a broad, dark brown to blackish stripe, pointed anteriorly, begins at the rostral, widens, and continues back to the shoulder or farther, then narrowing, becomes broken up into one or two series of disconnected quadrangular spots; rostral light; two light lines have their origin here and continue back along canthi, above eyes, and along the sides of the back where they are lost in the general color of the back; after the shoulder is past they develop regular black spots on alternate scales. A dark lateral band begins at nostril, passes back involving eye and upper part of labials, and the upper part of auricular opening; it then passes along the side of the body, where it gradually breaks into series of dark and lighter spots, forming five discontinuous lines; a few lighter flecks appear anteriorly on the dark band and lighter flecks are prominent on the sides; posterior dorsal part of body and tail (unregenerated parts) marked more or less regularly with quadrangular dark spots; chin, throat, belly, underside of tail and underside of limbs uniform greenish or dirty cream; narrow longitudinal dark stripes on limbs; sides of neck and lower labials with dark vermiculations; lower part of upper labials immaculate, appearing as a white line.

Variation. The type has not been available for study. It is obvious that the type is a much smaller, probably much younger, specimen than those which I have examined. The most significant difference in the type and the specimens studied is the very much narrower head, it being less than half the length (possibly an error

Measurements of *Eumeces schwartzei* Fischer

Museum Number Sex	Hamb. type	Mich. 68226 ♂	U.S.N.M. 71948 ♂	M.C.Z. 29238 ?	U.S.N.M. 71409 ♀	U.S.N.M. 71380 ♂	M.C.Z. 24504 ?
Snout to vent	78	112	113	113	118	120	120
Tail	128	127*	127*	.....	78*	133*	.....
Snout to foreleg	.....	36	37	35	39	42	35
Snout to ear	15	20	20	19.5	20	23	20.2
Snout to eye	.....	8	8.5	9	8	11	9
Width of head	6	18	16.5	15	16	19	16
Length of head	14	18	17	18	19	19	18
Width of body	.....	22	24	.....	24	24	.....
Postanal tail width	.....	15	15	13	14	15	16
Axilla to groin	.....	64	65	65	68	67	68
Foreleg	19	26.5	28	24	.....	28	27
Hind leg	27	37	40	37	.....	39	39
Longest toe	.....	12.5	12	12.5	.....	13	13

* Regenerated partly.

Type, from Laguna de Términos, Campeche; 68226, 29238, Chichen-Itzá, Yucatán; 71948, 71409, 71380, 25404, Petén, Guatemala.

in measurement). The limbs overlap when adpressed. That the limbs overlap in the small, younger specimens is the normal expectancy in this genus, even though they are separated in the adults.

A specimen in the Michigan University Museum, No. 68226, agrees in practically all essential scale characters. The regenerated tail shows two stages of regeneration; the older proximal part has the scales very irregular in size and shape, while the distal (more recent) part, 50 mm. in length, has throughout the greater part of its length only a single dorsal and a single ventral series, which meet laterally. The first pair of chinshields is separated by a single scale. The color agrees save that the shade varies; thus the areas between the black stripes on the head are almost a dove gray, but fade to the leaden gray of the back; the limbs are brownish gray, the scales with darker spots forming lines, eight on forelimb, eighteen on the posterior.

The following additional variation is noted in the six specimens studied: two have the parietals very slightly separated, the others have them in contact. The number of scales from occiput to above vent are from 60 to 63, the first number occurring five times; the upper labials are invariably eight. Nuchals and the scales between the nuchals and the beginning of the large median series are: one,

4-5 nuchals, 12-11 smaller body scales; one, 4-5 nuchals, 10-10 smaller; one, 5-5 nuchals, 11-11 smaller; two, 5-5 nuchals, 12-12 smaller; one, 5-4 nuchals, 12-13 smaller scales. No variation was noted in the supraoculars save that two were partly fused in one specimen. The postmentals, loreals and labials preceding the subocular are constant. The frontonasal is broader than long in two specimens, the length and width equal in four; the frontonasal touches frontal in all specimens; two supraoculars are in contact with the frontal in all specimens. All have three presuboculars, and four or three postsuboculars. The limbs fail to touch in all, by a distance of from 5 mm. to 10 mm.

The scale rows about the body show the following variation: On neck behind ear, 32 to 39; on narrow part of neck, 26 to 29; behind arm, 29 to 31; around the middle of the body, 19 to 21 (19 occurring only in one Guatemalan specimen); 15 to 16 about base of the tail. The scales surrounding the ear vary from 21 to 24, 21 in two specimens, 22 or 23 in two, and 24 in two. The superciliaries are 8-8 save in one specimen, which has 10-8. Ear lobules are three or four. The subdigital lamellae of fourth toe vary from 15 to 17, 16 being the most frequent number.

The pitting on the posterior edge of the scales is very prominent on posterior side of foreleg; on the side, above and behind the foreleg; on the posterior side of hind leg and on tail behind the hind leg; also in the postauricular region. The pitting is but dimly evident on neck and sides of body. There is a faint suggestion of striations on dorsal scales, the striae being located above the main canals of the scales which are visible in some of the specimens.

The description of the coloration of the younger type specimen given by Fischer states that the light lines beginning on the rostral are yellow anteriorly, becoming more rose posteriorly, giving a rosy tone to the last two thirds of the back. The broad, dark lateral streak on the sides of the body is mixed with yellow and rosy light spots. The markings agree in most details with those previously given.

Remarks. The species apparently is most closely related to *altamirani.* These forms, together with *managuae,* constitute a clearly defined group whose relationships are with western Asiatic, rather than with any other group on the American continent. (See discussion under the *Taeniolatus* group.) Fischer (1884) compares it with *Mabuia brevirostris* (*Eumeces brevirostris*) as the most

closely related species in the New World. However, the relationship with this form is no closer than with any other known species outside of its own group.

Little is known of its habits. Two labels, on National Museum specimens, with notes by Harry Malleis, their collector, which state: "caught in a trap" and caught "in hot sun" in trap, suggest diurnal habits. Whether the species is ovoviviparous could not be determined from the specimens examined. I presume that it is an arboreal form.

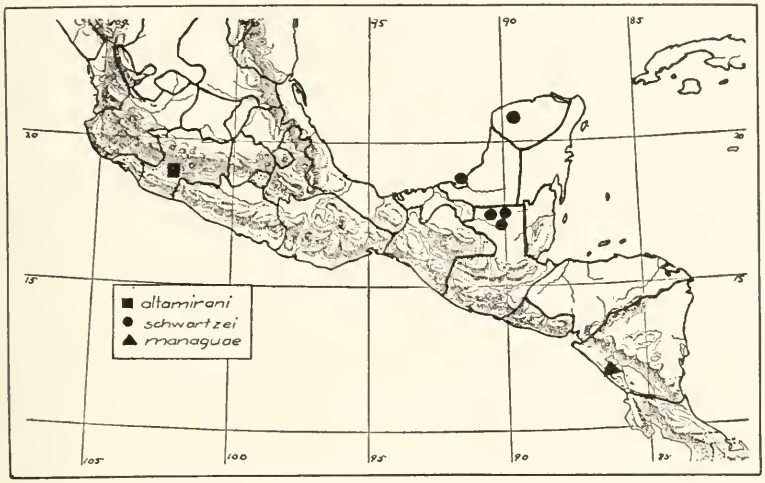


FIG. 6. Distribution of the species of the Schwartzei group in Mexico and Central America

Distribution. The records available suggest that *schwartzei* is a lowland forest form, occupying the lowland territory east and south of the isthmus of Tehuantepec, to and including Guatemala.

Locality records.

CAMPECHE: Island in the Laguna de Términos. (Type locality) (Hamburg 1; type).

YUCATAN: Chichen-Itzá (M.C.Z. 1 Shattuck) (Mich. 1).

GUATEMALA: Remate, Petén (U.S.N.M. 2, H. Malleis Coll.); Chuntuqui, Petén (U.S.N.M. 1, H. Malleis Coll.); Uaxactun, Petén (M.C.Z. 1).

Eumeces altamirani Dugès

(Plate 2; Fig. 6)

SYNONYMY

1891. *Eumeces altamirani* Dugès. La Naturaleza, (2), I (1887-1890), 1891, pp. 485,486, pl. XXII (in color) with 6 figs. (type description; type locality, "regiones cálidas del Estado de Michoacán," Mexico; Altamirano Coll.); (*Platypholis* is suggested as a generic name, but not used); and *idem*, (2), II, 1894, pp. 480 and 485 (Apatzingan); Boulenger, Zoöl. Record, 1893, pp. 1-38 (notes that *Platypholis* Dugès is preoccupied by *Platypholis* Boulenger, 1890).

History. This species was founded on a single specimen which was discovered in the low part of Michoacán (regiones cálidas) and forwarded to Alfredo Dugès by Dr. Fernando Altamirano, then director of the Instituto Médico Nacionál. Dugès published a good description in either the latter part of 1890 or the first part of 1891 (probably the latter), together with a hand-colored plate. This figure is satisfactory for the general color markings and the body contour. The details shown, however, are very untrustworthy.

In a later publication, Dugès lists the form and gives Apatzingan (Apatzingan de la Constitución, Michoacán) as a locality, presumably referring to this as the type locality, since no additional specimen is mentioned. The author appears to have been unaware of the description of *Eumeces schwartzei* by Fischer, published in 1884, and considers his species to be related to *Eumeces hallowelli* Bocourt, and makes a comparison of the form with *Eumeces Bocourti* Boulenger.

I was able to make an examination of the type specimen, now in the Alfredo Dugès Museum, Guanajuato, Guanajuato, Mexico, and concluded that it represents a species distinct from, but most closely related to, *Eumeces schwartzei.* It is more distantly related to the recently described *Eumeces managuae* Dunn.

Diagnosis. A member of the *Schwartzei* group. A large species lacking typical dorsolateral or lateral light lines; likewise, lacking a median line bifurcating on head. General color light yellow-brown, with small blackish spots on the scales; no elongate black stripe on head continuing to middle of the body. Three or four nuchals, followed by 12-11 widened body scales, in turn followed by 45 very broad, median scales, making a total of 59 from parietals to above anus; median preanal scales very large, their edges overlapping the small adjoining scales bordering the anus; heel plates not greatly enlarged; parietals inclose the interparietal; four supraoculars. Scales in 19 rows; one postmental; one postnasal; eight upper labials.

*Description of species** (from the type, an unnumbered specimen in the Alfredo Dugès Museum, Guanajuato, Mexico).

Rostral moderate, triangular, wider than high; supranasals in contact, forming a suture slightly more than half their length; frontonasal large, broadly in contact with frontal, forming sutures with the anterior loreals, which are smaller than those with supranasals or the prefrontals; latter pentagonal, their sutures with the frontal only slightly smaller than those with the frontonasal; sutures with the two loreals nearly equal, as are those with the first superciliaries and first supraoculars. Frontal angular anteriorly and posteriorly, relatively narrow, touching two supraoculars; frontoparietals in contact (their size cannot be determined because of a wound; the same is likewise true of the interparietal); parietals narrowly in contact behind the interparietal; latter followed by a small scale narrowly separated from it by the union of the parietals, and partially separating the first pair of nuchals; nuchals wide, three on one side, four on other.

Nasal moderate, followed by a single postnasal; two loreals; three presuboculars, four-five postsuboculars; primary temporal forming a suture with the lower secondary, separating the eighth labial from the large upper secondary temporal; tertiary temporal present; eight upper labials; three superciliaries touching first supraocular; last of the series large (regarded by Dugès as a fifth supraocular); postmental single, followed by three pairs of chinshields, the first two separated by a single scale. Ear opening oval, with four lobules on the anterior border; lower eyelid with six enlarged semitransparent plates.

Scales in 19 rows about the middle of the body, the nuchals followed by 12-11 widened body scales which are followed by 45 large, transversely widened scales, making a total of 59 scales in a row from parietals to above anus; median preanal scales greatly enlarged, the outer smaller, the inner scales overlapping the outer scales; plates bordering heel not so large as in *schwartzei;* lamellar formula for fingers: 6; 10; 12; 13; 9; adpressed limbs widely separated. Character of scale pits not discernible.

Color (in alcohol). General color light yellow-brown, with a few scattered black dots on the head; the occipital and nuchal region lighter than rest of body, and without marking; the median dorsal scales are of a darker shade than those of neck, each scale with one

* In my examination of the type I was not permitted to remove the specimen from its container; as a result much of the detail must necessarily be omitted.

or more small, blackish dots, placed more or less irregularly, not forming lines; along the sutures of the median series an unspotted line extends to the tail, outlined by a row of brown dots along the middle of the first lateral scale row, one dot on each scale; a second unspotted line follows the first and second scale rows with a broad, brown band, darkest on neck, and is flecked and reticulated with lighter color; on the sides of the head, it is represented by a series of heavy brown dots or spots on the edge of the labials; the fifth scale row has a series of dark dots from axilla to groin; unregenerated part of the tail with brown dots on each scale; on the regenerated part these are scattered; apparently unspotted below.

Measurements* of *Eumeces altamirani* Dugès

Head length	15	Body width	17
Head width	14	Tail (reg.)	99
Body length	68		

Remarks. As I was unable to make a complete examination of the type, much detail is lacking in the description. It differs from both *schwartzei* and *managuae* by the very different color patern, but is undoubtedly more closely related to *schwartzei.*

Distribution and locality records. Only the type locality, Apatzingan, Michoacán, Mexico, is known. (See Fig. 6 for distributional map.)

Eumeces managuae Dunn

(Plate 3; Figs. 6, 7, 8)

SYNONYMY

1887. *Eumeces taeniolatus* (Non Blyth) Boulenger. Cat. Liz. Brit. Mus., III, 1887, p. 383 ("India;" Brief description).

1933. *Eumeces managuae* Dunn. Proc. Biol. Soc. Wash., 46, 1933, pp. 67, 68. (Type description. Type locality Managua, Nicaragua.)

History. This striking species, since the publication of the third volume of Boulenger's catalogue, has been masquerading under the name of an Indian species, *Eumeces taeniolatus.* In this work a short description of a specimen is given, but no locality data other than "India," and no collector's name is given.

Owing to my discovery that *Eurylepis taeniolatus* Blyth and *Plestiodon scutatus* Theobald were founded on the same types, it was apparent that Boulenger's specimen belonged to an unnamed species. In 1932 Mr. H. W. Parker, of the British Museum, kindly furnished me with photographs of this specimen, which were clear enough to permit a detailed study of the scales as well as the color

* From Dugès.

markings. It was obvious after an examination of the photographs, that the relationship was with *Eumeces altamirani* and *Eumeces schwartzei,* rather than with an Indian species, and that the species was an undescribed form, probably from Central or South America.

Apparently no further specimens reached any museum until 1932, when a specimen was discovered in the aviation field at Managua, Nicaragua, by James H. Ivy, and forwarded to the United States National Museum through Dr. S. S. Cook. It was described by Dr. E. R. Dunn, Mar. 24, 1933. The type is now U.S.N.M. No. 89474.

Dunn called attention to the fact that, "In some ways each of the American Species [i. e., *Eumeces schwartzei* and *E. managuae*] is more like one of the Indian species than it is like its American relative." It is presumed that he meant that *managuae* was more like *taeniolatus* Boulenger than it was like *schwartzei;* but he did not consider the possibility that they were identical. Dunn gives a key to a part of this group of *Eumeces,* based upon the number of nuchals, placing the two American species (he does not consider *Eumeces altamirani* Dugès) in a group having 14-17 pairs of nuchals; the two presumed Indian forms in the group having 4-5 nuchals. As a matter of fact both the Indian and American species have practically the same number of nuchals. Dunn has mistaken the widened body scales following the nuchals for true nuchals, and these are present in *Eumeces taeniolatus* Blyth, averaging about 12 in number, which by Dunn's interpretation would give 16 nuchals, and consequently would not differ in this character from the American forms.

Diagnosis. A large species, a member of the *Schwartzei* group, characterized by a median series of greatly expanded scutes, extending from the shoulders to a point near the base of the tail; inner preanal scutes overlapping the outer; nostril pierced in a very small nasal directly above the suture of the rostral and first labial; upper palpebral series all in contact with the superciliaries; four pairs of expanded nuchals; two tertiary temporals, not strongly differentiated; one postmental; a postnasal; three presuboculars; two pairs of postlabials; large auricular lobules; terminal lamellae of toes bound tightly about base of claws; two greatly enlarged heel plates; subcaudals transversely widened; no differentiated lateral postanal scute; adpressed limbs widely separated; brown, dark lined, above.

Description of type. (U.S.N.M. No. 89474.) A large species.

The rostral broad, relatively low, the part visible above forming a very obtuse angle, and much less in area than the frontonasal; supranasals large, transversely placed, forming a median suture; frontonasal much larger than the prefrontals, rounded anteriorly, laterally in contact with the anterior loreals; prefrontals generally pentagonal, forming sutures with the frontonasal, frontal, second loreal, first supraocular, first loreal, and first superciliary, the sutures varying in length from larger to smaller in the order named; frontal somewhat rounded anteriorly, with a small pointed tip posteriorly, which touches the interparietal; frontoparietals much

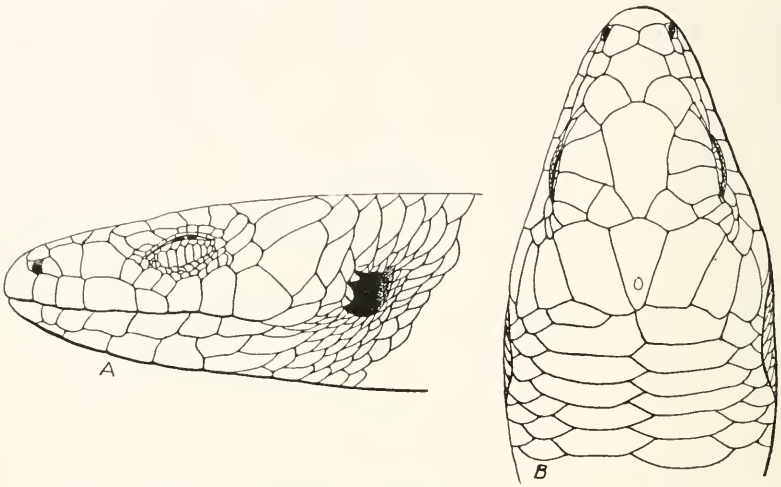


FIG. 7. *Eumeces managuae* Dunn. U.S.N.M. No. 89474; Managua, Nicaragua. A, lateral view of head; B, dorsal view of head. Actual head length, 15 mm.; width, 13 mm.

smaller than the prefrontals (one abnormally fails to touch the second supraocular, allowing the third supraocular to contact the frontal); interparietal narrowing to a blunt point behind, in contact with nuchals; parietals about three fifths as wide as long.

Four supraoculars normally (the fourth divided, forming five on the right side); four pairs of broad nuchal scales (the left anterior small), followed by several widened body scales; nasal small, merely a rim about the nostril, save for a minute triangular moiety at the upper anterior corner; nostril very large, pierced in the nasal directly above the suture of rostral and first labial; nasal probably not divided, although there is a trace of a groove from nostril to the supranasal and perhaps another to the rostral (certainly not to the first labial as is true of most American *Eumeces*).

Postnasal nearly as large as nasal; anterior loreal large, much wider at top than bottom, much higher than second loreal; second loreal a little longer than high; three well-defined presuboculars (a character shared only with *Eumeces* of the *Schwartzei* group); nine-eight supereiliaries, the anterior narrow, elongate, as is the last, and of about same size; a minute preocular, narrowly in contact with the loreal, with two small scales above and behind it; two very small postoculars; four postsuboculars, the upper large, of same size as the last supereiliary; primary temporal rectangular, broadly in contact with the large fan-shaped lower secondary; upper secondary rather angular, bordered posteriorly by the nuchal but in contact with the upper and larger of the two tertiary temporals.*

Of the anterior pair of postlabials the lower scale is largest; these followed by a second pair of which the upper is largest; eight upper labials, five preceding the subocular (nine on right side, where the third appears to be segmented); six lower labials; mental with a labial border slightly greater than the rostral; postmental relatively small, narrow; three pairs of chinshields, only the anterior pair in contact; first postgenial small, bordered internally by a larger and longer scale; upper palpebral scales small, directly touching supereiliaries throughout the greater part of the series. Lower palpebrals small, with a series of six or seven enlarged semitransparent scales separated from the subocular by two rows of granules. Line separating the postauricular series from the lateral nuchals forms a strong diagonal. Ear opening large, with three (or two) lobules; about 23 scales around ear.

Scales from parietals to above the anus, 69, arranged as follows: four pairs of nuchals, followed by thirteen pairs of widened body scales, which are in turn followed by fifty-two much widened median scales five or six times as wide as long; scales around anterior nuchal region, 30; about constricted portion of neck, 23; about axillary region, 25; about middle of body, 17 rows; 13 about base of tail; lateral and ventral scales much widened; subcaudals greatly widened, five or six times as wide as long; no well-defined area of granular scales back of insertion of the forelimb (usually not more than two short rows); a few granules behind insertion of hind limb; the intercalated scale series of the axillae disappear before a distance equal to forearm to elbow is reached.

Twelve scales about insertion of forearm; palm with an outer

* These scales, while not occupying the same position with regard to the upper secondary temporal, appear to be the tertiary scale divided in two. This condition obtains in certain Asiatic and African forms.

wrist tubercle moderately well defined, with four or five smaller posterior tubercles, and three large padlike anterior scales surrounded by smaller granules; fingers with four rows of scales to tip, the formula for the ventral lamellae being: 7; 10; 11; 11; 9. The terminal upper scale is very small and is, with the terminal lower lamella, tightly bound about the base of the claw, allowing apparently but little movement of the claw; seventeen scales about insertion of hind limb; two greatly enlarged triangular scales on heel and a single enlarged scale on the sole surrounded by smaller, granular, slightly imbricating scales; lamellar formula for toes: 6; 9; 13; 14; 9. Toes with four scale series, the terminal ones same as on fingers.

Color and markings. Above generally a sepia or bistre, the ground color of sides lighter; the head dark, due to numerous angular dark areas. Two dark, more or less continuous lines begin on parietals and continue along the middle of the back, but become obsolete on the base of tail. A second, somewhat less distinct, dark line begins on the second scale row while similar dark lines follow the third and fourth rows to tail, that on the fourth row being best defined; fifth, sixth, and seventh rows with less-distinct dotted lines; limbs with dotted lines; scales of tail above, each with a darker area, not forming lines. The ventral surface of head, body, and limbs cream white; subcaudal scales strongly dotted with dark gray or blackish; upper and lower labials light, each with a strongly defined dark spot.

Measurements of *Eumeces managuae* Dunn

Museum Number Sex	U.S.N.M. 89474 ♂	British Mus. 53, 8, 17, 6 ♂
Snout to vent	117	116
Snout to eye	7.8	7.2
Snout to ear	17.4	17
Snout to foreleg	33	32.5
Axilla to groin	65	66
Foreleg	20	19.7
Hind leg	26	26.7
Width of body	15	15
Width of head	13	14.5
Length of head	15	14.4
Postanal width	10	10.2
Tail	.....	168*

* Tip regenerated and extreme tip missing.

Variation. The specimen from the British Museum, described by Boulenger as *Eumeces taeniolatus* (No. 53, 8, 17, 6) differs for the most part in only minor details. The supraoculars are 4-4. (Boulenger has mistaken the last large superciliary for a fifth supraocular); superciliaries 8-8; upper labials 7-7; the number of scales around the neck, body, and tail are identical with the type.

Two points of difference may be noted, both of which are within the expected range of variation. One is, that the interparietal is inclosed by the parietals, a character which, if found constant, might warrant giving the specimen a different designation. (This char-

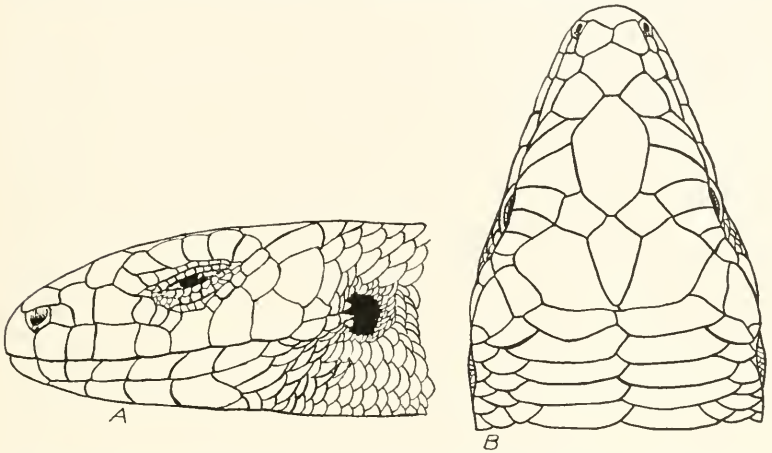


FIG. 8. *Eumeces managuae* Dunn. British Mus. No. 53, 8, 17, 6. A, lateral view of head; B, dorsal view of head. Actual head length, 14.4 mm.; width, 14.5 mm.

acter, while usually constant in *Eumeces*, is variable also in *Eumeces schwartzei*.) The other character is the presence of only five paired scales following the nuchals instead of thirteen pairs as occurs in the type. However, there is only a difference of two scales in the total number from parietals to above anus.

That the total number of broadened dorsal scales varies and likewise the number of the paired scales between the nuchals and the broadened scales is shown by the variation in both *Eumeces taeniolatus* Blyth and *Eumeces schwartzei*. In the former the paired scales are known to vary from 12 to 16 (four specimens); in the latter from 10 to 13 (six specimens). Larger series will probably show a much greater variation.

Save for the fact that the color markings of the British Museum specimen have faded, they are identical with those of the type.

An examination of the table of measurements shows that the two specimens are almost exactly the same size, differing scarcely more than one millimeter in any measurement.

Remarks. That so large a species should exist in Central America and remain unknown save for the two mentioned specimens suggests that the species may even be eventually discovered in northern South America. Nothing is known of its habits.

Distribution and locality records. Only the type locality is known. (See Fig. 6 for distributional map.)

TAENIOLATUS GROUP

Only a single Asiatic species, *taeniolatus*, is here included. It is characterized by four or five pairs of nuchals, followed first by paired scales, then directly by a much widened median series of scales. A large postnasal present; two (rarely one) postmentals; frontal in contact with the interparietal, which is not inclosed by parietals. Limbs small, widely separated when adpressed; heel plates not much enlarged; upper palpebral scales not in contact with superciliaries; terminal lamellae of toes not bound tightly about base of claws. Inner preanal scales overlap outer; three supraoculars touch frontal; two presuboculars; last labial separated from ear by about four pairs of postlabials. Twenty-one scale rows. As remarked under the *Schwartzei* group, I regard the fusion of the median scale series (incomplete in *Schwartzei* group) as a character possibly independently arrived at in the two groups. The form has no close relatives, but it probably has more specialized characters in common with the *Schneiderii* group than with any of the others.

It is quite probable that in the material here considered there is more than one species. The specimens in European museums should be segregated and reviewed. (Note comments of Parker under variation.) The specimen here described differs considerably from the characters shown in a photograph of the type, but to what extent this is due to the eighty years of preservation of the type I cannot say.

Eumeces taeniolatus (Blyth)

(Plates 4, 5; Figs. 9, 10)

SYNONYMY

1854. *Eurylepis taeniolatus* Blyth. Journ. Asiat. Soc. Bengal, XXIII, 1854, pp. 739-740 (type locality, Salt Range, Punjab, India, Theobald Coll.).

1866. *Plestiodon scutatus* Theobald. Extra Number Journ. Asiat. Soc. Bengal, No. CXLVI, 1866, pp. 25-26 (type description; no record of habitat or donor; 2 specimens).

1870. *Plestiodon* (*Eumeces*) *scutatus* Jerdon. Proc. Asiat. Soc. Bengal, 1870, p. 73 (Alpine Punjab on route from Jhelum into Kashmir).

1871. *Mabouia taeniolata* Anderson (part.). Proc. Asiat. Soc. Bengal, 1871, p. 184 (apparently this description is drawn from one of the types of *taeniolatus*).

1872. *Eumeces taeniolatus* Stoliczka. Proc. Asiat. Soc. Bengal, XLI, 1872, pp. 75-76 (Urira, Northwestern Kach); *idem*, p. 88; Blanford, Journ. Asiat. Soc. Bengal, XLIV (n. s), pt. II, No. 3, 1875, p. 191; Theobald, Desc. Cat. Rept. British India, 1876, p. 65, and addenda, p. X, and synopsis, p. X; Murray, Vert. Zoöl. Sind, London-Bombay, 1884, p. 356 (Sind); Blanford, 2d Yarkand Mission, Rept., p. 19 (Chakoti on road from Mari to Srinagar in Kashmir); Annandale, Journ. Asiat. Soc. Bengal, 1905 (New Series), I, No. 5, pp. 148-150 (Salt Range); Hora, Rec. Indian Mus., XXV, 1923, pp. 369-376 (only types mentioned).

1887. *Eumeces scutatus* Boulenger. Cat. Liz. Brit. Mus., III, 1887, p. 382 (Sind, Punjab, Kashmir); Fauna British India, Rept., 1890, pp. 218-219 (Cutch); Proc. Zoöl. Soc. London, Dec. 1891, p. 628 (Puli Hatun [Pul-i-Khatun], Transcaspia); Nikolsky, Mem. Acad. Imp. Sci. St. Petersburg, XVII, No. 1, 1905, pp. 184-185; Mikhailovski, (Yearb. Zoöl. Mus. Imp. Acad. Sci. St. Petersburg, Russian Text), IX, 1904, p. 41 (Durun, near Askhabad and Bakharder); Annandale, Journ. Asiat. Soc. Bengal (new series), I, No. 5, 1905, pp. 148, 150 (Sind, Karachi Mus.; Rajputana [Bellety Coll.], N. Kashmir, Chitral [Daly Coll.], Afghanistan [Green Coll.]); Deriugin (Proc. St. Petersburg Naturalists Soc., Russian Text), XXXVI, pt. 1 and 3, Authors separate (Andera, near Sumbar, Transcaspia); Nikolsky (Fauna Russia and Neighboring Countries, Russian Text), 1915, I, p. 508 (Reports specimens obtained by Vasiliev, 1904, Arvaz Pass at Korpet-dag); Ingoldsby and Proctor, Journ. Bombay Nat. Hist. Soc., XXIX, Apr. 20, 1923, p. 126 (Kaur Bridge, Ladha, Wana, in Waziristan, N. W. Frontier Province).

History. The two first specimens of this species were, so far as is known, collected in the Salt range in Punjab, by William Theobald, who was, at that time, a member of the Geological Survey of India. In 1854 Blyth, curator of the Zoological Department of the Museum of the Asiatic Society of Bengal, described the same two specimens under the name of *Eurylepis taeniolatus*, at the same time making them the type of a new genus. The descriptions leave much to be desired. The characters of the head scales are said to be as in *Anolis pave* and *Scincus pavimentatus* Geoffroy-St. Hillaire, in Savigny, Desc. Egypt. It is apparent that a very hasty examination of the details of the animals was made, for later authors have pointed out errors in the description. In 1866 (1868) Theobald, in preparing a catalogue of the reptiles in the Museum of the Asiatic Society of Bengal, describes *Plestiodon scutatus* as a new species, from two adult specimens without data regarding locality or collector. It seems apparent that these two are really the types of Blyth's *Eurylepis taeniolatus*, since the catalogue apparently takes

no cognizance of other specimens, or of the species *taeniolatus*. Fortunately the description is clear and the more essential characters are recorded. The measurement of the total length is somewhat different (9.75 as to 9 inches; tail length, 5.75 as to $5\frac{1}{4}$ inches). The second of the two specimens may have been measured. In 1870 T. C. Jerdon obtained and reported a specimen, which was identified as *scutatus*, from the Alpine Punjab on the route from Jhelum into Kashmir. This specimen was apparently sold to the British Museum and is now No. 70, 11, 29, 9 in that institution.

Anderson (1871), while discussing the genus *Eurylepis*, gives a careful and a somewhat more extended description of the types of *Eurylepis taeniolatus* Blyth. He states: "Both Blyth and Theobald have fallen into some inaccuracies regarding certain of their characters. The former says that the nostril is pierced in a small, separate, nasal shield, an error repeated by Theobald. Mr. Blyth also states that the lower eyelid has a translucent disk, but Mr. Theobald more accurately describes it as scaley with a transverse row of large plates. He, however, says the body is surrounded by 23 rows of scales, while the two specimens exhibit only 21 in the middle of the body, and Blyth limited them to 19."

It is self-evident that Anderson regarded the types of both species to have been founded on the same specimens, and places *scutatus* Theobald as an absolute synonym of *taeniolatus* Blyth.

Stoliczka (1872) reports specimens from Kachh. Theobald (1876), in his Descriptive Catalogue of the Reptiles of British India, recognizes only one species, *Eumeces taeniolatus*, and places his species *scutatus* as a synonym and gives as measurements: length of body, 3.75; tail, 5.25; totaling 9 inches—the total length given by Blyth and perhaps an admission of his own error in the original description.

W. J. Blanford (1875, and 2d Yarkand Mission Rept.), reports on a specimen, collected on the road from Mari to Srinagar in Kashmir, which, if indeed of this species, is one of truly enormous size (18 inches in total length, of which the tail [probably regenerated] is only 6 inches).

Boulenger (1887) again rescues *scutatus* from synonymy, describing the species from T. C. Jerdon's specimen and a half-grown specimen collected by Theobald, which was then in the British Museum; and from another specimen lacking all data, he describes a form as *Eumeces taeniolatus*. From these two descriptions it was obvious that two species were involved, a fact that was borne

out by photographs of the two forms furnished me by Mr. H. W. Parker of the British Museum. With the publication of the description of *Eumeces managuae* by Dunn (1933), it became evident that Boulenger's specimen was of this species and must have originated in Central America rather than India. It agrees in practically all essential details with *managuae*.

Due to the courtesy of Mr. H. W. Parker, I have been enabled to examine the type, and unhesitatingly place *Eumeces taeniolatus* Boulenger (non Blyth) as a synonym of *Eumeces managuae* Dunn. (Note discussion of this specimen under *managuae*.)

Diagnosis. A large species having a generalized pattern of three wide, brown stripes on the body, a median and two lateral, which tend to become obscured with age and replaced by irregular series of darker angular spots. Characterized by four or five pairs of nuchals, followed by a series of paired scales, which in turn are followed by a median series of broad scales five times as broad as long, extending to near point of insertion of hind limbs; a large postnasal; two loreals; two (rarely one) postmentals; four supraoculars, followed by a much enlarged posterior superciliary appearing much like a fifth supraocular. Frontal in contact with interparietal, which is not inclosed by the parietals; snout narrow, compressed, the portion of the rostral visible above very large, nearly equal in area to the frontonasal. Limbs small, widely separated when adpressed; plates bordering heel subequal, not greatly enlarged; superciliaries separated from upper palpebral scales; inner preanal scales overlapping outer.

Description of species. (From Field Museum, No. 1868, "Puli Hatun," Transcaspia.) Head small, narrowed anteriorly; body elongate, moderately slender. Portion of rostral appearing above more than two thirds the size of the frontonasal, more or less pointed behind, narrowly separating the nasals, the anterior portions of which are broadly visible above; supranasals smaller than nasals, nearly transversely placed, forming a median suture, touching postnasals, and narrowly (on one side) the first loreal; frontonasal broader than long, broadly in contact with the first loreal (on one side also with the postnasal); prefrontals relatively large, broadly in contact mesially, forming a much longer suture with the first than with the second loreal; the suture with superciliary larger than that with the first supraocular; frontal truncate anteriorly, forming a very obtuse angle, constricted medially, posterior width equal to anterior and with a slight rounded projection on its

posterior edge in contact with the interparietal; frontal touching three supraoculars; frontoparietals smaller than prefrontals, separated narrowly; parietals truncate behind, in general the shape of a parallelogram, not inclosing the interparietal, separated or only minutely in contact with the fourth supraocular, being separated by the very large posterior superciliary which appears like a fifth supraocular; interparietal of moderate size, and of typical shape; four pairs of broad nuchals; nasal large, higher than wide, the nostril pierced anterior to the rostrolabial suture, distinctly divided by grooves, the anterior part very much the larger; postnasal large (loreal, according to Boulenger [1887]), equally in contact

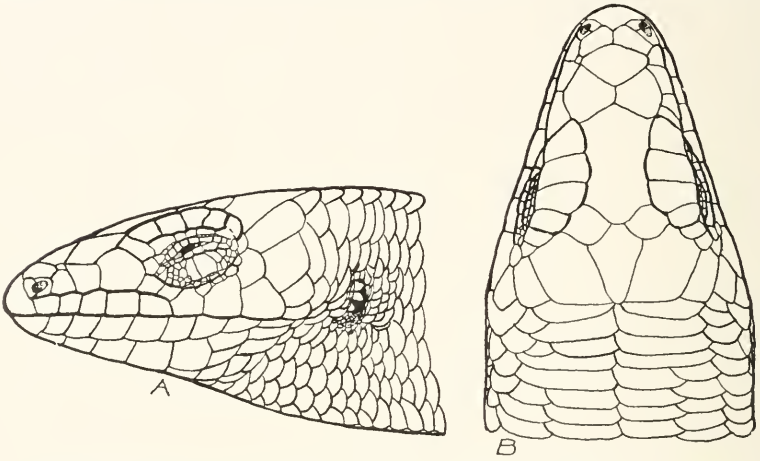


FIG. 9. *Eumeces taeniolatus* (Blyth). E.H.T. Collection, No. 4888; Puli Hatun, Transcaspia. A, lateral view of head; B, dorsal view of head. Actual head length, 13 mm.; width, 11 mm.

with the first two labials, much higher than posterior part of nasal; first loreal nearly as large as second, higher than second, nearly as long as high, touching second and third labials; second loreal only minutely longer than high; two presuboculars, the anterior touching two labials; four very unequal postsuboculars; one small preocular; two small postoculars; eight superciliaries, last as large as first; upper palpebral scales separated from superciliaries by a complete series of scales on upper eyelids; three enlarged plates on lower eyelid, separated from the subocular by three irregular rows of tubercles; primary temporal of moderate size; upper secondary temporal large, widened posteriorly; lower secondary somewhat fan-shaped, very narrowly in contact with primary; tertiary temporal elongated, forming a suture with upper secondary, separated from ear by three scales.

Eight upper labials, the eighth somewhat larger than seventh; five labials preceding the subocular, the suture of first with the rostral about two thirds the height of the scale; last labial separated from the ear by four pairs of postlabial scales, covering a distance much greater than the length of last labial, the upper scales of the first two pairs much the largest of the series, the others decreasing in size; extent of the mental on the labial border distinctly greater than that of rostral; two postmentals, the first much shorter than mental; first pair of chinshields shortest and smallest, in contact; second pair largest; third pair much narrower than second, their posterior edge rounded; these followed by a pair of elongated postgenial scales, not strongly differentiated from other scales following chinshields, each bordered on its inner edge by a scale similar in shape and size.

Ear opening relatively small, with three auricular lobules, upper much the largest; about 22 scales surround the ear; line separating the postauricular scales and lateral neck scales, distinct, vertical; line separating the lateral neck scales from the suprabrachials arises above anterior point of insertion of arm; about 81 scales from parietals to above anus: these consist of four pairs of nuchals followed by twelve paired widened scales, these followed by 57 single median scales, a little more than five times as broad as long; then follows eight paired scales; 32 rows of scales around neck behind ear; 27 about narrow part of neck; 29 in axillary region; 21 about middle of body; twelve about base of tail; lateral rows parallel, the scales on sides smallest; six preanal scales, the median pair very large, almost as long as wide; the median preanals overlap the outer scales; the posterior line of the preanal scale not or but slightly differentiated; small series of scales on posterior anal border missing; a series of broad subcaudal scales; regenerated tail with a broad dorsal series.

Limbs relatively small; about fifteen scales about insertion of arm, with two rows of minute granules in axilla; 21 about insertion of hind leg, with one or two rows of minute granules behind insertion. Palm with a scattered series of large, flat tubercles, interspered with smaller tubercles; outer wrist tubercle not strongly differentiated; lamellar formula of fingers: 6; 8; 12; 13; 7. Fourth toe only slightly longer than third; six subequal scales forming a continuous series on heel; sole with numerous larger, scattered, tuberculate scales; lamellar formula of toes: 6; 9; 14; 15; 11; claws long, the upper terminal lamella hood-like, not tightly bound

about base of claw; toes surrounded by only dorsal and ventral series save on outer side of the proximal joint.

Color. Above generally putty gray to gray-brown, the median dorsal area bearing a browner stripe extending to tail, but growing indistinct posteriorly, bearing quadrangular brown spots more or less irregularly distributed and not forming rows; spots more numerous anteriorly; first lateral scale row with a regular series of brown dots on alternate scales; on sides another brownish stripe covering part of the second, third, and fourth rows; scales of the second, third, and fourth rows with brown spots usually appearing on every other scale, frequently forming vertical series; a few small, whitish flecks on lateral scales alternating with the vertical series of brown dots; head colored like body with a few brown flecks along margins of scales; upper labials generally light, slightly edged with brownish; the temporal scales with definite brown spots; entire ventral surface immaculate cream, the color extending up to fourth scale row but becoming slightly tinged with bluish gray; however, the fifth row has an irregular series of brown spots; regenerated tail fawn-colored with very small irregular brown spots.

Measurements of *Eumeces taeniolatus* (Blyth)

Museum Number*	Field 1868	E.H.T. 4888	M.C.Z. 4370	M.C.Z. 4493	M.C.Z. 7192
Snout to vent	105	98.2	132	117	104
Tail	.....	154	.....	178	.....
Total length	.....	252.2	.....	295	.....
Snout to foreleg	24	25.2	33	28.5	.....
Snout to ear	16	15	16	14	.....
Snout to eye	6	5.8	5.5	5	.....
Axilla to groin	69	63	86	76	67
Width of body	14	14	.....	.....	.....
Width of head	11	10.4	14	13	.....
Length of head	13	12.2	15	15.2	.....
Foreleg	20	19	22	23	.....
Hind leg	24	22.5	33	30	24
Longest toe	9	8.2	9	8	7

* Nos. 1868 and 4888, Puli Hatun, Transcaspia; 4370 and 4493, Amballa, India; 7192, Karachi, India.

Variation. Only a very limited number of specimens have been available for study. It is apparent that a greater amount of variation may be present than is shown in these five specimens, and in published data.

The number of scale rows is 21 normally; a single specimen (Amballa, Ind.) has 19. Blyth's statement of 19 scales in the type is contradicted (see History). All the other specimens have 21. Scale rows behind ear about neck, 32-33; about constricted part of neck, 27-29; about axilla, 29-30; about base of tail, 13-15. Three specimens have the upper labials, eight-eight; one, seven-seven (Amballa). Scales about ear vary 20-21; there are four pairs of nuchals in all; the number of pairs of divided median scales vary from 12-12 (Puli-Hatun) to 15-16 (Karachi). All show only four supraoculars, but the last superciliary is enlarged and might be mistaken for a fifth; postmental divided; postnasal large in all. Boulenger interprets this scale as a loreal scale making three loreals; its position and relationship to adjoining scales makes it imperative to recognize this scale as the postnasal enlarged. The last labial (seventh or eighth) is largest; the nasal is of moderate size; the relation of the nostril to the suture is the same in all; the frontonasal and frontal are separated in all. The frontonasal touches the postnasal as well as the first loreal; three supraoculars touch the frontal, and the frontal is invariably in contact with the interparietal; two presuboculars, normally; one in the Karachi specimen. The postsuboculars are 4-4 or 5-5, the anterior (inferior) ones small, not well differentiated; ear lobules 3-3 or 3-4; these are usually somewhat wrinkled or puckered; the formula of the postlabial series in front of ear usually 1; 1; ½; ½; ½; in one specimen it is ¼; ½; 1; 1. The total number of scales from parietals to above anus, 78 to 83, the lowest number being in the specimen from Amballa, India, the highest, the one from Karachi. The character of the heel and palm scales is similar in all. In all, the tertiary temporal is divided, or, two are present, the lower not touching the upper secondary temporal. The adpressed limbs are separated, in all, by six or seven scale lengths. In all, the upper palpebral scales are separated from superciliaries by a row of granules; and the inner preanal scales overlap the outer smaller ones; Annandale (1905) points out that one of the types has two, the other, one, postmental.

The color is generally the same. The stripes apparently are more definite in younger specimens. The whitish dots on the side vary in distinctness; the annulation of the tail is more marked in Transcaspian specimens.

The very large specimen mentioned by Blanford gives a maximum snout to vent measurement of approximately 175 mm.

Concerning a British Museum specimen from El Kubar, S. W. Arabia, Mr. H. W. Parker writes:

"The El Kubar specimen might conceivably be racially distinct, but on the basis of a single specimen it would, I think, be very unwise to describe it. The color pattern is more intense than in other specimens, so that the lateral and middorsal dark bands, instead of being composed of spots, are solid from the forelimbs forward and the middorsal extends forward over the head to the rostral; the lower surface of the tail is beset with brown spots like its upper surface."

Distribution. The present known distribution is western Asia from S. W. Arabia to Yarkand, including Transcaspia, Persia, Afghanistan, Baluchistan and northwestern India. It is not known from Asia Minor or Trans-Caucasia.

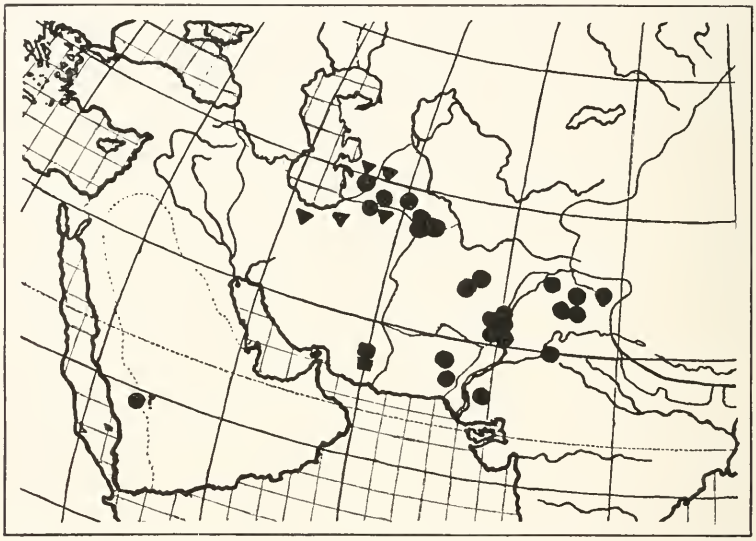


FIG. 10. Distribution in Asia of *Eumeces tacniolatus* (Blyth) ○; *Eumeces zarudnyi* Nikolsky □ and *Eumeces princeps* (Eichwald) △. Distributional data on *Eumeces princeps* are very incomplete.

Locality records. (In certain cases I have not been able to check identifications of material on which some of the locality records are based, since they are in European or Asiatic museums.)

ARABIA: El Kubar, S. W. Arabia (Brit. Mus. 1, Bury Coll.).

TRANSCASPIA: Puli Hatun (Pul-i-Khatun) (Brit. Mus. 8, Eylandt Coll.); Bacharden (Senckenberg 1, A. Zander Coll.); Ai Dare (Senckenberg 1, O. Boettger Coll.); Arvuz Pass at Kopet-dag (Nikolsky, 1915); Durun near Askhabad and Bakharden (Mikhailovski, 1904); Andera near Dumbar (Univ. of Petrograd 2; Nikolsky, 1915).

BALUCHISTAN: Kondalo (München 1, Zugmeyer Coll.); Bela (München 1, Zugmeyer Coll.).

AFGHANISTAN: (Indian Mus., Green Coll.; Annandale, 1905).

INDIA: Sind (Indian Mus.); Rajputana (Indian Mus., N. Billety Coll.); N. Kashmir (Indian Mus., 2d Yarkand Miss.); Chitral (Indian Mus., F. J. Daly Coll.); Waziristan N. W. India, Kaur Bridge (7 spec.), Ladha (8 spec.), Wana (19 spec.) (Ingoldsby and Proctor, 1923); Punjab (type locality. Mus. As. Soc. Bengal 2); Alpine Punjab on the route from Jhelum into Kashmir (Brit. Mus. 1, Jerdon Coll.); Urira, N. W. Kachh (Stoliczka, 1872); Chakoti on the road from Mari to Srinigar in Kashmir (Blanford, 2d Yarkand Miss.).

SCHNEIDERII GROUP

The species and subspecies included in this group are characterized by the absence of a postnasal; the palpebral scales separated from the supereiliaries; one or two postmental shields; the more median preanal scales overlap the outer ones; a rather large area of small granular or pavement-like scales behind insertion of hind limb; when hind limb is laid back along tail a small pocket is formed lateral to anus.

The forms included in the group are *Eumeces algeriensis algeriensis, E. algeriensis meridionalis, E. pavimentatus, E. zarudnyi, E. princeps* and *E. schneiderii.*

The taxonomy of this group, occupying territory in western Asia and northern Africa, has long been in a confused condition. That certain forms were long known before the time of Linnaeus is evidenced by a form appearing about 1640 in a work by Ulyssis Aldrovandi (Quad. Digit. Ovip., Lib. 1, p. 660) under the name *Lacerta Cyprius scincoides,* a name placed as a synonym of *Lacerta aurata* by Linnaeus in the 10th edition of Systema Naturae. It appears, however, fairly certain that the *Lacerta aurata** is a species quite distinct from the Cyprian lizard illustrated by Aldrovandi.

The first "Linnaean" name applicable to any skink of this group is *Scincus schneiderii* of Daudin (1802, Vol. IV, pp. 291-292), which he describes as follows: *"Major, supra lucidus fuscescens lineâ longitudinale pallidâ in utroque latere, subtùs albescens caudâ duplò longioré."* In the synonymy he cites several references (Seba, Schneider, Gronovius, Lacépède), all to authors who used names which are non-Linnaean. He states: "J'ai rapporté à l'anolis

* In regard to the identity of *Lacerta aurata* consult the discussions of the following authors: Duméril and Bibron, Erp. Gen., V, pp. 702, 703; Wiegmann, Archiv. für Mus., 1837, pt. 1, p. 134; Gravenhorst, Nova Acta Acad. Leopold Carol., XXIII, pt. 1, p. 321, pl. XXXII; Peters, Monatsb. Akad. Wiss. Berl., 1864, p. 51. On the other hand, Gray (Cat. Spec. Liz. in Brit. Mus., 1845, pp. 91, 92) applies the name to a north African *Eumeces,* and Günther (1864, Proc. Zoöl. Soc. London) applies the name to a *Eumeces* from the Dead Sea region; he also does the same in the Reptiles of British India (1864), giving Persia as a locality.

doré la plupart des synonymes qui ont été regardés par Lacépède comme semblables au scinque doré; mais je dois avouer ici que j'ai cru nécessaire de m'y déterminer, dans l'espoir qu'on pourra parvenir dans la suite à eclaircir cette partie réelment obscure de l'histoire naturelle des sauriens."

One gathers from the text that the skink *Scincus schneiderii* is described from a specimen in "la galerie du museum d'Histoire Naturelle" (Paris).*

This species is compared with the *scinque rembruni.* He further states: "Sa couleur est d'un brun clair très-luisant en dessus, lorsqu'il court an soleil; mais il ne paroît pas avoir l'éclat de l'or pendant qu'il est vivant; aussi ne peut-on pas lui paisser l'épithete de *doré;* c'est pourquoi j'ai préféré lui donner celle de *schneidérien,* . . . La couleur d'un brun clair, que régne dessus ce grand scinque, est tranchée sur chaque flanc par une ligne droite et longitudinale blanchâtre, que va depuis les bras jusque auprès des cuisses; le dessous de cet animal est blanchâtre, sans aucune tache et sans aucun grain poreux sons les cuisses. La queue est cylindrique, et deux fois environ aussi longue que le reste. Tous les écailles qui la recouvrent sont rhomboidales, presque hexagones et un peu imbriquées."

The measurements given (reduced to millimeters) are: total length, approximately 392 mm.; head and body, 114 mm.; tail, 278 mm.; hind leg, 46 mm.; front legs, "sont plus courtes."

Shaw (1802), under the name *Lacerta rufescens,* describes a species (probably from Seba, p. 112, taf. 105, fig. 3), giving as the habitat Arabia, Egypt and Cyprus, and placing *Lacerta Cyprius scincoides, Lacerta aurata? L.,* and *Lacerta maritima maxima* Seba as synonyms. It appears that he had not seen Daudin's work, which was probably published when Shaw's description was written. The characters offered are as follows: Fifteen inches or more in length from nose to the end of the tail, color pale rufous brown, with a paler stripe down the back and along each side; the head is covered in front with large angular scales; the body, limbs and tail with rounded ones; legs short and thick. It is highly probable that Shaw's name represents a composite of more than one species, and cannot be certainly identified.

In 1820 Merrem (Syst. Amph., 3, 1820, p. 71) used the name *Cepedii,* based on Lacépède's description of *Le Doré.* Since the

* According to Duméril and Bibron (1839, V, p. 703), it is the same specimen which served as a model for the description and the figure in Lacépède's Histoire Naturelle des Quadrupedes Ovipares et des Serpens (1788-'90, I, p. 384, pl. 25). It was still in the museum in 1839.

description is from a specimen which is the type of *schneiderii* it is obvious that these names are synonyms. In Savigny's Description de l'Egypte (Histoire Naturelle Reptiles, published presumably in 1827) appears descriptions of two forms, one, *Scincus schneiderii* (p. 135, pl. 3, fig. 3; L'anolis gigantesque), a more or less uniformly colored specimen with a light lateral stripe; and a second species, *Scincus pavimentatus* (p. 138, pl. IV, fig. 4), represented as being brown with light dorsal lines. Thus, *pavimentatus* is apparently the first name for the species having a series of dorsal, light, narrow lines.

The name *Scincus cyprius* of Cuvier (1829, Reg. Anim., 2d Ed., p. 62) was used for a form occurring in "Levante," and harks back to the *Lacerta Cyprius scincoides* of Aldrovandi, and *Eumeces schneiderii,* portrayed by Geoffroy-St. Hillaire. Gray (1831) used the name *Tiliqua cyprinus,* but I am uncertain whether this was intended as a new name or is an error or emendation for Cuvier's *cyprius.*

Duméril and Bibron (1839, V, p. 701) describe the skinks of north Africa under the name *Plestiodon aldrovandii,* including a specimen from Bône, Algeria, and two from Egypt, one of which, if I interpret correctly, served as the type of *Le Doré* Lacépède, and of *Scincus schneiderii* Daudin. In consequence, it is, at least in part, a synonym of *schneiderii.* In the list of synonyms is given one of the forms listed as *l'Anolis gigantesque* and *Scincus schneiderii* by Geoffroy-St. Hillaire in the Descript. Egypt; but Geoffroy-St. Hillarie's other form, *Scincus pavimentatus,* apparently is overlooked, or at least no allocation of this name could be found. It is mentioned on page 629 in a quotation from Wiegmann.

The discussion given by Duméril and Bibron makes it evident that *Lacerta aurata* Linné is a species different from *aldrovandii.* They also give a discussion of other synonyms of *aldrovandii,* but offer no reason for disregarding the appellation given by Daudin. The Algerian specimen listed is very likely a specimen of *Eumeces algeriensis.*

Eichwald (1839) described as new a species (*princeps*) from western Asia ("In ora caspia occidentali, ad montes praesertim Talyschenses"). The description (in Latin) is good and refers to a species with the color of the head, back, limbs and tail uniform dark gray, and with a lateral light line.

From the foregoing it is evident that, with the exception of the Geoffroy-St. Hillaires, who recognized two species, the authors who

preceded them, and those who followed for many years, believed that there was only a single species, and each devised a name of his own choosing.

It was not until Boulenger's catalogue (Vol. III) appeared in 1887 that the name *schneiderii* was reëstablished, the name having been overshadowed by the names *pavimentatus* and *aldrovandii*, both actually used for all the various forms of the group, which were regarded apparently as a single species. Before Boulenger's catalogue appeared, two subspecies were described: *Eumeces pavimentatus* var. *algeriensis* by Peters (1864) from the western part of north Africa; and *Eumeces pavimentatus* var. *syriacus* was described by Boettger in 1883. The type locality of the latter was "Sarona bei Jaffa, Syria." This specimen is referred by Mertens (who had ready access to the type) to the synonymy of *schneiderii pavimentatus*.

As remarked, Boulenger (1887) revived Daudin's name *schneiderii* for the British Museum skinks of the genus (Tunis, Egypt, Syria, Armenia, Persia, Baluchistan) and retained Peter's *pavimentatus algeriensis* for the species occurring in Algeria and Morocco under the specific designation of *algeriensis*.

In 1899 Nikolsky described *Eumeces zarudnyi* from Persian specimens collected by N. A. Zarudny in the provinces of Kirman and Seistan, Persia. Domergue (1909) later described a subspecies, *algeriensis meridionalis*, from Ain Sefra, Algeria.

Robert Mertens (1920), in a paper under the title "Uber die geographischen Formen von *Eumeces schneiderii* Daudin," makes a first attempt to review the group, and he later (Nov., 1924) makes a second revision. In this latter work he recognizes four subspecies of *schneiderii*, namely, *schneiderii, pavimentatus, cyprius* and *algeriensis*. *Schneiderii pavimentatus* Geoffroy-St. Hillaire is used for the Syrian form, including as a synonym Boettger's (1883) *syriaca*. For the form from Algeria and Morocco the name *algeriensis* Peters is used, including in the synonymy a subspecies, *algeriensis meridionalis* Domergue, as well as *Plestiodon aldrovandii* (part.) Duméril and Bibron and *Plestiodon auratus* (part.) Gray.

He states "Nach Prüfung mehrerer Stücke aus Nordafrica, bin ich zum Ergebnis gekommen, dass der Unterschied zwischen *Eumeces schneiderii cyprius* und dieser Form [*algeriensis*] gar kein so grosser ist, und da diese beiden Formen nirgends nebeneinander vorkommen, halte ich es für richtiger die westliche Form als Unterart zu *Eumeces schneiderii* zu stellen." For the species occurring in Lower Egypt to eastern Algeria the name *schneiderii cyprius* Cuvier is used.

The name given by Cuvier is based on Aldrovandi's *Lacerta cyprius scincoides,* and on Geoffroy's plate (Desc. of Egypt, pl. III, fig. 3), which would make it in part synonymous with *schneiderii.* (The figure of *Lacerta cyprius scincoides* of Aldrovandi [Quad. Dig. Vivip., 1663, p. 660] is without any marks of distinction save for a light stripe on the sides, the scales being drawn with no attempt at accuracy.)

The typical form *schneiderii,* Mertens believes, is restricted to a west Asiatic form. He states (Mertens, 1924a, footnote): "Herr Prof. Lorenz Müller in München machte mich kürzlich darauf aufmerksam, dass der Daudin'schen Originalbeschreibung von *Eumeces schneiderii* vermutlich diese westasiatische Form zu Grunde lag."

On what such a judgment is based I am uncertain. I presume on the meager data given as regards color. I believe beyond question that the type locality is Egypt or Sinai, as the type specimen, as already mentioned, also served as a cotype for *Plestiodon aldrovandii* and was one of two Egyptian specimens mentioned as follows by Duméril and Bibron (1839): "Cette espéce se trouve en Egypte et en Algerie; nous en possedons deux individus de premier de ces deux pays; et un troisieme qui nous a été envoye vivant de la province d'Alger par M. Guyon." Again speaking of the type of Daudin's *schneiderii,* they state: "Individu qui existe encore aujourd'hui dans notre Musée National."

To anyone who has followed the foregoing discussion it must appear obvious that the confusion in the literature regarding these forms is almost insurmountable, and, as regards some points, must remain obscure. The placing of literature references under the various species must necessarily be subject to uncertainty. The uncertain references are left in the synonymy of *schneiderii.*

A more certain judgment of the status of the various forms of the *Schneiderii* group can only be obtained when large series are available for study. My own material is too meager and from too few localities to determine relationships, or delineate the various forms without some doubt as to the validity of my judgments.

It is a fact that as regards the general pattern of head scales there is marked similarity among many of the forms. However, there are many characters usually not mentioned in descriptions which may be regarded as important in differentiation of species as is the head squamation, such as size, length of limb, scale rows on limbs, intercalated scale rows on toes, postlabial, temporal and postgenial scales.

It is likely that in these different forms there may be a tendency to duplicate color pattern. The lateral line and red, orange or copper spotting is present in several forms, and there is likely to be similar variation in two or more forms. It appears certain that, at least in parts of the territory occupied by the group, two or more forms may be present.

The task of straightening out the present tangle that obtains should involve an examination by a single person of the material in all European collections, including all types, if extant, and the segregation of large series of new material from numerous localities throughout the range of the group. Until this is done, some doubt and confusion must remain. I know of no more worthy task in the field of herpetology.

KEY TO THE FORMS OF THE SCHNEIDERII GROUP.

A. No lateral line of cream, orange or red on the sides of the body; a pattern of light transverse lines extending to or nearly to abdomen; auricular lobules blunt; two scales occupy area of the typical subocular labial; postgenial scales small, about as broad as long; typical heel plates not strongly differentiated from scales that precede and follow; about 25 scale rows around upper arm, 27 rows about femur; no notch formed by the second presubocular on the upper labial border; scales more or less striated.

B. Eight or nine upper labials; nasal divided; 70 scales from occiput to above anus; 30 scales about neck and 30 rows about middle of body; 20 to 24 about base of tail; length of frontal a little less than its distance from end of snout; subocular labial about size of the preceding labials; pre- and postsuboculars form a distinct continuous series; median scale rows about one and three-fourths times as wide as the adjoining scales; four or five pairs of nuchals; on inner side of fingers the series of scales intercalated between the dorsal and ventral lamellae only at base, with a single scale near tips, except fifth, where the series is complete from base to tip; on outer side the intercalated series is complete to tip save on fifth finger; on toes on inner side one or two intercalated scales on basal phalanx; on outer side series complete to tip. Above brown, with a series of irregular cross-bands of cream or orange extending to abdomen; intervening irregular rows of ocellated reddish spots. Snout to vent 185 mm. (Algeria and Morocco. Plains form.) ..... *Eumeces algeriensis algeriensis* (Peters), 146

BB. Similar in many respects to *E. a. algeriensis*, but scale rows 27 to 28; one pair of nuchals; fewer scales about base of tail; 60 to 62 scales from occiput to above anus; scales of the pre- and postocular series more elongate; snout to vent 124 mm. (Ain Sefra and adjacent territory. Plateau form.)

Eumeces algeriensis meridionalis Domergue, 152

AA. A lateral line to, and sometimes continued on, tail; pattern of dorsal spots, if present, not reaching below lateral line; auricular lobules four to six, usually more or less sharply denticulate (somewhat short in *blythianus*); only one typical subocular; typical heel plates differentiated from adjoining scales; postgenial scales longer than wide; less than 25 scales around middle of upper arm; a more or less distinct notch in upper labial border made by second presubocular; scales not striated.

B. A single postmental. Thirty scale rows around middle of body; 59 or 60 scales from occiput to above anus; nasal divided; postgenial only slightly longer than wide; limbs elongate, overlapping when adpressed; olive-brown above, with three dark brown lines along back from head to some distance on the tail; a broad dark band along the side of the body, below which is a well-defined pale yellowish band extending from below eye to some distance on tail; a dark line below this; tail slender. Snout to vent, 90 mm. (Punjab, India.)

Eumeces blythianus (Anderson), 143

BB. Two postmentals.

C. Tail red at base; ear with five or six acute lobules; scales in 26 rows; limbs overlap when adpressed; uniform brownish gray, with a whitish lateral line; snout to vent, 111 mm. (Southeastern Persia [probably also Baluchistan].)

Eumeces zarudnyi Nikolsky, 142

CC. Tail not red at base.

D. Nasal incompletely divided, lacking the lower suture from nostril to rostral; plates on lower eyelids small, scarcely differentiated; 66–68 scales from occiput to above anus; 13 scales around middle of upper arm; 20 scales about femur; 24 scale rows about middle of body; 19 scales about base of tail; pre- and postsubocular series discontinuous or nearly so; subocular labial not larger than certain preceding labials; anterior loreal a little longer than high; on inner side of fingers one or two intercalated scales, fifth with three; on outer side the scales half the length of the second, third and fourth fingers; on inner side of toes one or two scales at base; on outer side the scales extend the length of first and second toes, half the length of the third and fourth. Brown with a dim dorsolateral lighter line and a strong lateral cream line; eight rows of very narrow, discontinuous cream lines. Snout to vent, 136 mm. (Egypt and Syria.)

Eumeces pavimentatus (Geoffroy-St. Hillaire), 133

DD. Nasal completely divided.

E. Plates on lower eyelid large, much higher than wide; 64 scales occiput to above anus; 17 scales about middle of upper arm; 24 scales around middle of femur; 26 rows about body; 19 about tail; pre- and postsubocular series discontinuous, or those below eye not differentiated from granules on eyelid; subocular labial large, slightly longer than high, no larger than certain preceding labials; anterior loreal much longer than high; on inner side of fingers, intercalated scales only at base, save on fifth, where the series extends the length of the digit; on outer side the series extends the length of first and second fingers, on the third and fourth on the basal phalanx only; on outer side of toes one or two intercalated scales at base only; on outer side, the series extends to tip on the first, second and third toes, about half the length of the fourth, and none on the fifth. Above uniform lavender or blackish gray, a light stripe from below eye to groin or on tail; below on sides very light grayish, becoming lighter below. Snout to vent, 124 mm. (Territory south of the Caspian Sea. Transcaspia, northern and eastern Persia.)

Eumeces princeps (Eichwald), 138

EE. Plates on lower eyelid small, scarcely higher than wide; 66 scales occiput to above anus; 15 scales about forearm; 24 about femur; 24 scales about middle of body; pre- and postsubocular scales continuous; 109 subcaudals; subocular as high as wide, larger than preceding labials; posterior loreal not much longer than high; on inner side of fingers one or no intercalated scales; on outer side same save on thumb, where series extends to tip; on inner side of toes only one or two intercalated scales at base; on outer side the series extends about half the length of first and second toes; only one or two at base of third and fourth. Above brown or olive, the median scale rows a shade darker; light spots on alternate scales of median rows extending onto tail; very dim dorsolateral lines; a slightly darker lateral band bounded below by a cream stripe from below eye; very light gray low on sides; below whitish; hind leg with numerous spots; a few scattered spots in the dorsolateral region, or nearly uniform olive or brown (golden). Snout to vent, 170 mm. (Syria, Arabia, Persia, Mesopotamia, Cyprus, Egypt, Tripoli, Tunis and eastern Algeria.)

Eumeces schneiderii (Daudin), 12[illegible]

Eumeces schneiderii (Daudin)

(Plates 6, 10; Fig. 1; Figs. 11, 1)

SYNONYMY

(Many of these titles may actually refer to species other than *schneiderii*.)

1800. *Lacerta scincus* (non L.) Georgi. Geogr. Phys. Beschr. Russ. Reich., T. 3, Bd. VI, 1800, p. 1876 (Kura); Hohenacker, Bull. Nat. Moscow, 1831, p. 365 (Caucasus) (possibly *princeps* [Eichwald]).

1802. *Scincus schneiderii* Daudin. Hist. Rept., IV, 1802, p. 291 (type locality not given; presumably Egypt; I. Geoffroy-St. Hillaire, Desc. Egypt, Nat. Hist., I, 1827, p. 135, pl. III, fig. 3 (locality not given; presumably Egypt; and figure probably from type specimen).

1802. *Lacerta rufescens* Shaw (part.). Gen. Zoöl., III, 1802, pp. 285-286 (pale rufous brown with a pale stripe; apparently based on Seba's figure. Arabia and Egypt, Cyprus.).

1820. *Scincus cepedii* Merrem. Syst. Amph., 1820, pp. 71-74.

1829. *Scincus cyprius* Cuvier. Reg. Anim., nouv. Ed., II, 1829, p. 62.

1831. *Tiliqua cyprinus* Gray. Syn. Griffith's Anim. King., IX, 1831, p. 68 (Egypt).

1832. ? *Scincus officinalis* (non Laur.) Dwigubuski, Mem. Soc. Nat. Moscow, 1832, p. 15, fig. 4 (In Russ.).

1839. *Plestiodon aldrovandii* (part.) Duméril and Bibron. Erp. Gén., V, 1839, p. 701 (Egypt and north Africa) (includes type of *Eumeces schneiderii* Daudin); Guichenot, Expl. Sc. Alger. Sc. Phys. Zool., 1850, p. 17; Duméril and Duméril, Cat. Meth. Coll. Rept. Mus. d'Hist. Nat., Paris, 1851, Paris, p. 164; De Filippi, Viagg. in Persia, 1865, p. 354; Steindachner, in Unger and Kolschy's Insel Cypern, 1865, p. 573; Gasco, Viagg. Egitto, pt. II, 1876, p. 109; Lortet, Arch. Mus. Hist. Nat. Lyons, III, 1883, p. 187.

1845. *Plestiodon auratus* (part.) Gray. Cat. Liz. Brit. Mus., 1845, p. 91 (N. Africa); Günther, Proc. Zoöl. Soc. London, 1864, p. 489 (Dead Sea).

1864. *Eumeces pavimentatus* Peters. Mon. Berl. Ak., 1864, pp. 48, 51; Anderson, Proc. Asiat. Soc. Bengal, 1871, p. 180; Stoliczka, Journ. Asiat. Soc. Bengal, 1872, p. 121; Blanford, East Persia, Zoöl. Geol., II, 1872, pp. 387-388 (Pishin, Baluchistan; Sarjan, S. W. Karman, Southern Persia; Niriz, East of Shiraz); Boettger, In Radde, Faun. Flora S. W. Caspian Geb., 1886, p. 57; and Zeits. Ges. Nat. (Geibel), 1877, p. 288; and Ber. Senck. Nat. Ges. 1879-'80, p. 183; Kessler, Trans. St. Petersb. Soc. Nat., VII, 1878, Suppl., p. 177 (Transcaucasian Region); Bedriaga, Bull. Soc. Imp. Nat. Moscow, 1879, No. 3, p. 27; Tristram, West Palestine, Rept. Batr., 1884, p. 152.

1864. *Mabouia aurata* Günther. Rept. Brit. India, 1864, p. 82 (Persia).

1883. *Eumeces pavimentatus syriaca* Boettger. Abh. Senck. Nat. Ges., XII, 1883, p. 120.

1883. *Plestiodon pavimentatus* Lortet. Arch. Mus. Hist. Nat. Lyon, III, 1883, p. 187.

1887. *Eumeces schneiderii* Boulenger. Cat. Liz. Brit. Mus., III, 1887, p. 383 (Dead Sea, Jerusalem, Palestine; Kirind, Persia, Shore Kelegar); Boettger, Zool. Jahrb., Bd. III, Syst., 1888, p. 918; Boulenger, Trans. Linn. Soc. Zoöl., V, 1889, p. 101; Fauna Brit. India, Rept. Batr., 1890, p. 219; Boettger, Ber. Senck. Ges., 1892, p. 147 (Posten Bartas, Caucasus); Anderson, Proc. Zoöl. Soc. London, 1892, p. 16 (Duirat, Tunesia); Boettger, Cat. Rept. Samml. Mus. Senckenb. Nat. Ges., I, 1893, p. 111 ("Sarona bei Jaffa," Jerusalem, Syria; Kopet-dagh, Transcaspia; Gabes, Tunis); Peracca, Boll. Mus. Torino, IX, 1894, No. 167, p. 9 (Es-salt and Dscherasch); Olivier, Mem. Soc. Zoöl. France, VII, 1894, p. 114; Boulenger, Trans. Zoöl. Soc. London, 1895, p. 136 (Cherb Berrania, Matmata, Wed Kebiriti [North of Chott Fejej] and Gafsa); Anderson, Contrib. Herp. Arabia, with Prelim. list Rept. Batr. Egypt, 1896, p. 104 (Marsa Matru; Maryut district, Egypt); Boettger, Jahr. Natur. ver. Madgeburg (1896-1897), 1898, pp. 1-22 (Syria); Anderson, Zoöl. Egypt, Rept. Batr., 1898, pp. 196-199, pl. XXV (Egypt. Excellent plate); Boettger, in Radde, Mus. Cauc., 1899, p. 282; Nikolski, Ann. du Mus. Zool., IV, 1899, p. 399 (Gerri Schotur in Chascht-Adno.); Nikolski, Herp. Turan., 1899, p. 44; Domergue, Soc. Geog. d'Arch. Prov. Oran, XX, 1900, pp. 269-272 ("Sahara, Tuneslen"); Nikolski, Mem. l'Acad. Imp. Si. St. Petersbourg, VIII Ser., Vol. XVII, No. 1, 1905, pp. 185-187 (Caucasus; Dshulfi near R. Arax; Baku; Beirut; Achal-tieke; Aul Aber [Astrabad]; Karatay; Balaschuan; Syria; Elisabethpol; Gululi-Dagh; Suljukli; Nuratin, Western Bukara; Samarkand; Palestine; Kerak, Moawia.); Annandale, Journ. Asiat. Soc. Bengal, New Ser., I, 1905, p. 150

(Baluchistan); Nikolski, Herp. Caucasica, 1913, pp. 110-112; Faun. Ross., I, 1915, p. 508 (Numerous localities); Werner, Verh. K. K. Zool.-Bot. Ges. Wien., Jahr. 1917, pp. 191-220 (Prov. Fars, Persia); Mertens, Senckenb., Bd. 2, Heft 6, 1920, pp. 176-179; Sachs, Blätt. Aquar-Terr., XXIX, 1918, pp. 281-282; Wolter, Blätt. Aquar-Terr., XXX, 1919, pp. 15, 339, 353; *idem*, XXIX, 1918, p. 290; Calabresi, Boll. Mus. Zool. Anat. Comp. Univ. Torino, 38, N. S. No. 7, 1923, pp. 4, 26 (Bengasi, Tobruk, Arenaica); Ingoldsby and Proctor, Journ. Bombay Nat. Hist. Soc., XXIX, Apr. 20, 1923, pp. 126, 127 (Kirghi, Jandola Kot Kai, Sarwekai Wana in Waziristan, Persia); Czernov, Bull. Sci. l'Inst. Expl. Reg. Caucase du Nord, V, No. 1, 1926, p. 64 Erivani Ordubar, Caucasus); Wetstein, Sitz. Kais. Akad. Wiss. Wien., Vol. 137, Heft 10, 1928, p. 783; Werner, Sitz. Kais. Akad. Wiss. Wien., Vol. 138, Bd. 1, Heft 2, 1929, p. 19.

1914. *Eumeces schneiderii syriacus* Barbour. Proc. New England Zoöl. Club, V, Dec. 2, 1914, p. 86 (Petra, Arabia); Mertens, Senckenb., Bd. IV, Heft. 6, 1922, p. 176.

1924. *Eumeces schneiderii princeps* Mertens. Abh. Ber. Mus. Nat. Heimat. Nat. ver. Madgeburg, Bd. III, Heft. 4, 1924, pp. 284-286, pl. XII, fig. 4.

1924. *Eumeces schneiderii cyprius* Mertens. Senckenb., Bd. VI, Heft. 5-6, Nov. 1, 1924, p. 183.

1924. *Eumeces schneiderii schneiderii* Mertens. Senckenb., Bd. VI, Nov. 1, 1924, pp. 182-183.

History. The history of this form is given under the discussion of the group.

Diagnosis. A very large species; generally gray-olive above; two rows of irregular cream spots on the two median scale rows; a well-defined cream-colored line from the sixth labial, passing through ear and on sides above the legs to some distance on the tail; two scale rows above the lateral cream line darker gray-olive; entire ventral surface dull cream.

Upper labials, eight; lower secondary temporal larger than upper; nostril above the rostrolabial suture; two loreals; two presuboculars. The seventh labial separated from the ear by three pairs of postlabials; three much enlarged auricular lobules; prefrontals in contact; four supraoculars, three touching the frontal; four pairs of nuchals; 66 scales from parietals to above vent; 24 scale rows around middle of body, the median dorsal rows much larger than other scales on the body; three chinshields; the postgenial scarcely differentiated; median preanals enlarged, overlapping smaller outer preanals; a well-defined area of small granular scales lateral to the anus, behind the leg forming a fold or pocket; limbs widely separated when adpressed.

Description. (From No. 6521, E.H.T. collection; Haiffa, Syria.) Rostral high, narrow, part visible above approaching the size of the frontonasal, or larger; supranasals are a little longer than wide, forming a median suture; frontonasal small, not or only a little larger than the prefrontals, in contact laterally with the anterior loreal; prefrontals pentagonal, forming a median suture (partly fused in this specimen); frontal much longer than its distance from

the tip of the snout, the sides constricted in the posterior third, then widening; frontoparietals pentagonal, forming a median suture, about the same area as the prefrontals; interparietal small, short, little larger than the frontoparietal; parietals large, angular, almost inclosing the interparietal; four pairs of slender nuchals.

Nasal quadrangular, nearly as long as high, the scale divided wholly or partially by two grooves from nostril, one to the supranasal, the other to the rostral; nasal touching two labials, the nostril above the rostrolabial suture; anterior loreal higher than wide, much higher than the posterior loreal; no postnasal; normally

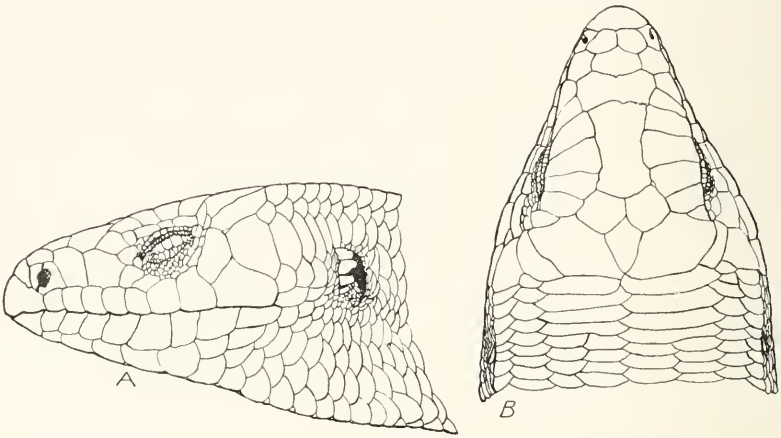


FIG. 11. *Eumeces schneiderii* (Daudin). E.H.T. No. 6521; Haiffa, Syria. A, lateral view of head; B, dorsal view of head. Actual head length, 24 mm.; width, 23 mm.

two presuboculars (on one side one scale is abnormal, being broken into five parts) forming a continuous series, below the eye, with the postsubocular series, of which there are seven; a preocular, followed by two or three smaller scales, and these by three rows of granular scales extending to posterior corner of the eye, separating the upper palpebral scales from the superciliary series; six superciliaries, the anterior very large, more than two and one half times the size of the last superciliary, and of nearly same area as the first supraocular; two small postoculars; three or four small scales on lower eyelid touching lower palpebral, and separated from the pre- and postsubocular series by about five rows of granules; four supraoculars, three in contact with the lower secondary temporal, which is very large, its posterior margin vertical, much larger than the upper secondary temporal, which is somewhat wider posteriorly

than anteriorly; tertiary temporal present, separated from ear by three scales, from the upper secondary temporal by a small undifferentiated scale that might be considered a second tertiary temporal.

Eight upper labials, the first smallest, trapezoidal; subocular labial longer than high; last (eighth) largest, but not as high as the seventh labial; last labial separated from the ear by about three pairs of scales, which are somewhat irregular, occupying a space equal to the length of the seventh labial; three large, and one smaller, toothlike preauricular lobules as long as the width of the ear.

Mental normally with about the same labial extent as rostral; two postmentals, the anterior very small; three pairs of irregular chinshields, the first pair in contact, the third pair widely separated; postgenial scales following not or scarcely differentiated; eight lower labials.

Scale rows parallel; median pair widened, more than two and one fourth times as wide as deep. Scales about the ear, about twenty-four; 27 rows about neck; 30 rows around body in axillary region; 24 about middle of body; preanal scales eight, the median greatly enlarged, overlapping the outer preanals, which diminish in size laterally; subcaudals much widened (100 in tail that has been reproduced); a small differentiated scale, with a raised rounded surface, near posterior lateral border of anus; legs short, strong; 18 scales about insertion of arm; numerous granular scales in axilla; palm with numerous, somewhat enlarged, padlike, overlapping tubercles, smaller about base of fingers; lamellar formula for fingers: 6; 9; 10; 12; 8; about 25 scales about insertion of leg; heel bordered by a series of enlarged plates, preceded by three or four enlarged scales; sole covered with subequal granules; lamellar formula for toes: 5; 10; 13; 16; 10. Terminal lamellae enlarged above and below, not binding base of claw; no intercalated series, the toes and fingers with only a dorsal and ventral series of scales; pits on scales, if ever present, have become entirely obsolete.

Body much elongated, the limbs separated by a distance equal to the length of six lateral scales. The body appears quadrangular in cross section and the tail likewise, the depth of the tail being a little greater than its width.

Color in alcohol. This very well preserved specimen is of gray-olive color above; the two median rows are darker than the two adjoining (second and third) while the fourth and fifth are slightly darker gray-olive than the median pair; the cream spots on the

Measurements of *Eumeces schneiderii* (Daudin)

Museum Number	E.H.T. 6521	M.C.Z. 7760	M.C.Z. 9860	M.C.Z. 9864	M.C.Z. 9862	M.C.Z. 9861	A.M.N.H. 12839	M.C.Z. 9869	M.C.Z. 9865	M.C.Z. 9863	A.M.N.H. 12838	M.C.Z. 9870	M.C.Z. 9872
Snout to vent	160	144	130	121	117	110	103	109	93	87	64	59	55
Tail	259	.....	.....	.....	.....	.....	201	.....	171	.....	115	106	94
Snout to eye	.....	12	9	9	9.5	8	.....	9	8	6.8	.....	5.2	5.2
Snout to ear	.....	25	25	22.3	22	20	.....	21	19	16	.....	12.5	12
Snout to foreleg	47	39	42	37	36	33	32	29	29	26	21	21	19
Axilla to groin	98	62	81	67	65	62	.....	68	50	46	.....	30	28
Length of head	24	23	20.2	21	19	18	.....	18.5	16	14.5	.....	11	11
Width of head	23	18	20	20	16	14	.....	15	13	12	8	9	9
Foreleg	34	.....	32	30	26	25	25	25	24	19	16	16	15
Hind leg	53	50	46	43	41	41	40	40	39	34	26	25	23
Longest toe	16	16	15	15	12	14	17	13	13	12	12	9	8
Anal tail width	21	17	16	14	13	12	11	12.5	11	8	5.5	5.6	5.4
Width of body	.....	.....	26	22	19	20	.....	20	17	16.5	.....	11	11

No. 6521, Syria; 7760, Jerusalem; others from Petra, Arabia.

two median rows are near the outer border and appear usually on every other scale, forming an irregular row; a few flecks on the dorsolateral scale rows; on the tail a few appear on the median dorsal rows; the lateral cream line from sixth labial spreads out and includes the corner of mouth and most of the ear border, and on the sides occupies all the sixth row and the outer edge of the fifth; below the lateral cream line, the body is gray for one or two rows. Under surfaces dirty cream; lower labials grayish. Head same as body. Hind limb with cream flecks, above, and somewhat brownish in the postfemoral region. Tail somewhat lighter than body, becoming cream on the entire regenerated portion (83 mm.).

Variation. A total of 17 specimens have been available in my study of this form and they agree in the main in most essential characters.

In no specimen other than the one described are the parietals in contact behind the interparietals, although only minutely separated in one specimen (A.M.N.H. 2280).

In all cases save one the lateral scales are parallel. This is Mich. 67251, Abd El Kadar, Lower Egypt, and the scales are arranged in long diagonal rows on sides. Scale rows about neck vary from 27 to 30, 29 being the usual number about the narrower part of the neck. The number of scale rows about the middle of the body is normally 24 (occurring in 13 specimens); 25 occur once, and 26 three times. The number of scales in a row from occiput to above anus is from 64 to 67, 64 occurring once, 65 occurring eight times, 66 five times and 67 twice (16 specimens counted); subcaudals vary in four specimens with complete tails as follows: 122, 128, 130, 131.

The upper labials are 8-8 in all the specimens save a single exception with nine. The scales about the ear vary usually between 20 and 22. Two specimens have 25; nuchals extremely variable, as follows: 2-2, twice; 2-3, once; 3-3, twice; 3-4, once; 4-4 seven times; 4-5, twice; 5-6, once.

Supraoculars invariably 4-4; the first three touching the frontal. Two postmentals and no postnasal is invariably the case in the series. The seventh and eighth labials are often of about the same size; sometimes the eighth is definitely the larger; five is the usual number of labials preceding the suboculars.

The nasal is distinctly divided in most of the specimens. The lower part of the suture is not evident in one. The frontonasal is invariably broader than long. The prefrontals are invariably

broadly in contact; subdigital lamellae vary between 15 and 18, 16 occurring most frequently. The pre- and postocular series are continuous and the formula is usually 2 + 5 or rarely 2 + 6, in one case each 1 + 6 and 2 + 7.

Color variation. The following specimens show variation from the described specimen. Mich. 67251 ♂, Abed El Kadar, Lower Egypt. Large specimen, 151 mm. snout to vent; 202 mm. tail. Above gray-olive (the head more brownish), covering about eleven scale rows; sides and underparts white or cream; faint gray spots on lower jaw, side of neck and along sides; limbs light olive-brown, spotted or dappled with white; much white on anterior surface of hind limb; back spotted with light, arranged in longitudinal as well as transverse rows (about 23 of the latter); spots about size of scales; last three labials and postlabials covered partly by a large cream spot. A slight striation is evident on ventral as well as dorsal scales. Tail with dim annulations.

No. 37291 U.S.N.M., Lower Egypt. ♂ 145 mm. snout to vent. Tail regenerated. Brown above with a slight tendency for the deeper brown color to form dim lines on the scale edges except along the median line. There are four of these dim, darker lines; the most distinct borders the first and second scale rows; the areas between make four very dim lighter lines; those on the second and third scale rows lightest; a white line from subocular to ear, widening in front of ear, but not reaching the top of ear; behind ear the line begins from lower half, follows along sides and to a considerable distance along tail, following fifth scale row, but not covering it; below this is a gray stripe that fades into the cream color of the ventral regions; two dim rows of light spots on back, the spots appearing on alternate scales. A few scattered light spots on tail.

In the series from Petra, Arabia, the tendency to form transverse bands of light spots is more pronounced than in Syrian or Egyptian specimens. Their color in life is as follows: "Rich bronzy olive, with scattered spots, on the dorsal scales, of the color of burnished copper, and a light lateral stripe of lemon-yellow or salmon-pink on the lower portion of the sides, and below brilliant glistening white, sometimes with a light greenish tinge. The young individuals are very differently colored. The middorsal area, comprising just the two rows of broad scales, is entirely unspotted. On each side of this region there are two narrow dark lines, and then a wide dusky lateral band from the neck region to the groin. This is

spotted with white scales. The lower regions of the sides, pure white in the adults, are mottled with dusky spots." (Barbour, 1914.)

Mr. H. W. Parker has submitted notes on British Museum specimens from Cyprus, as follows:

"Uniform brownish above. A strong white line from upper lip or ear onto base of tail. Scales 24 or 26 (6 specs., 4 with 24 rows). The only specimen showing any trace of the juvenile livery has a faintly darker middorsal zone the width of the two middorsal scale rows, faintly edged with darker brown. This is separated by a lighter dorso-lateral stripe from a wide dark lateral stripe two scales wide. This is bordered below by the strong white lateral line. One adult shows a few scattered white spots on the base of the tail and towards the flanks."

Distribution. This form, as here recognized, extends apparently from eastern Algeria and Tunis across north Africa and into western Asia, and on the island of Cyprus. The published records of the occurrence of this form are not included, and I am in doubt, in many cases, as to whether the various specimens listed belong to this species.

Locality records:

EGYPT: (Type locality; type formerly in the Paris Museum); Lower Egypt (A.M.N.H. 1) (U.S.N.M. 1); Abd el Kadar (Mich. 1).
ARABIA: Petra (M.C.Z. 10) (A.M.N.H. 2).
SYRIA: Haiffa (E.H.T. 1); Mt. Jerusalem (M.C.Z. 1).
ALGERIA: (U.S.N.M. 1).

Eumeces pavimentatus (Geoffroy-St. Hillaire)

(Plate 5, fig. 2; Figs. 12 and 13)

SYNONYMY

(As has been stated, it is scarcely possible to associate certainly with this form all literature references which apply to it; some of the titles listed under *schneiderii* may properly belong here.)

1827. *Scincus pavimentatus* Is. Geoffroy-St. Hillaire. Descr. Egypt. Hist. Nat., 1827, p. 138, pl. IV, fig. 4.
1834. *Eumeces pavimentatus* Wiegmann. Herp. Mex., 1834, p. 36; and Arch. für Natur., I, 2, 1835, p. 288 (genotype).
1883. *Eumeces pavimentatus* var. *syriaca* Boettger. Abh. Senck. Nat. Ges., XIII, s. 120 (type locality "Sarona bei Jaffa, Syrien," G. Sinion Coll., 1881).
1924. *Eumeces schneiderii pavimentatus* Mertens. Senckenbergiana, Bd. VI, heft 5-6, Nov. 1, 1924, p. 183.

History. This species appears first to have been recognized by Geoffroy-St. Hillaire and his son, Isadore, who describe and figure the form in Savigny's "Description d' Egypte" as *Scincus pavimentatus.* In 1834 Wiegmann placed the form under his newly formed genus *Eumeces* and the following year designated the species as the genotype.

Boettger (1883) described a form occurring in Syria, *Eumeces pavimentatus syriacus*. Mertens, who has examined the type of *syriacus*, places it as a synonym of *schneiderii pavimentatus*.

Diagnosis. One of the *Schneiderii* group, characterized by a slender, elongate body. General color brown above, with a more or less well-defined lateral line along the side of the body to the groin, little or no evidence of spots on the labials, and the line from the ear to foreleg not widened. Scale rows on back with very small, elongated white dots or dashes on the middle of each scale, save the two median rows, where the dashes are on every other scale. These white marks make a series of eight dotted lines on the back. Scale rows, 24 about body; two postmentals; no postnasal; nasal undivided. Median dorsal scale rows widened.

Description of species (from K. U. No. 11022, "Haiffa, Syria," O. Tofohr, collector). Portion of rostral visible above distinctly larger than the frontonasal; supranasals relatively small, in contact medially; frontonasal broader than long, in contact laterally with the anterior loreal; prefrontals relatively very large, much larger than the frontoparietals, broadly in contact medially, the suture with the frontal largest; frontal longer than its distance to end of snout, relatively narrow, narrower than the supraocular region; frontoparietals relatively small, forming a median suture; interparietal small, not inclosed by the parietals; four pairs of nuchals.

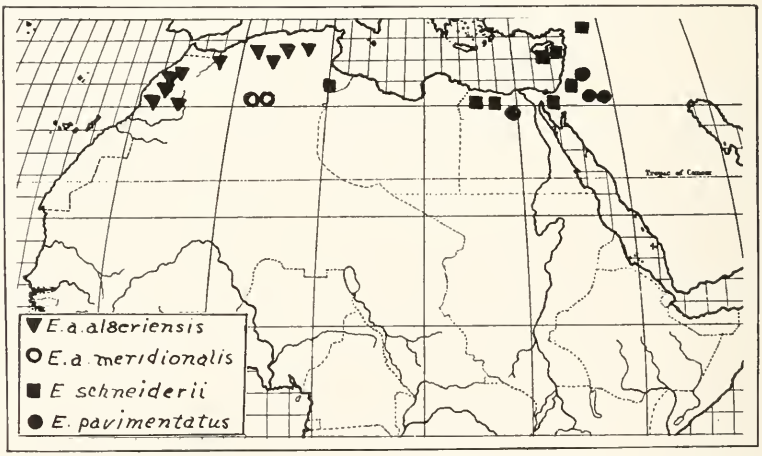


FIG. 12. Distribution in Africa and Asia of *Eumeces schneiderii* (Daudin), *E. algeriensis algeriensis* (Peters), *E. algeriensis meridionalis* Domergue, and *E. pavimentatus* (Geoffroy-St. Hillaire). Data on *E. schneiderii* and *E. pavimentatus* very incomplete.

Nasal longer than high, the scale with a suture running from supralabial to the nostril, but no suture is apparent from nostril to the rostral; from lateral view nostril is directed straight in; no postnasal; anterior loreal higher than wide, but not or only slightly higher than the posterior loreal; the latter only slightly longer than high, and strongly differing in shape and character from the same scale in *schneiderii;* two large presuboculars, more or less continuous with the seven postsubocular scales, of which the anterior are very

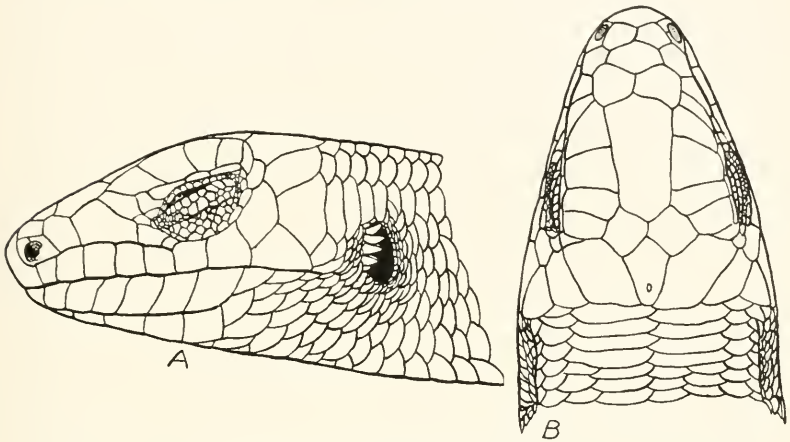


FIG. 13. *Eumeces pavimentatus* (Geoffroy-St. Hillarie). K.U. No. 11022; Haiffa, Syria. A, lateral view of head; B, dorsal view of head. Actual head length, 19.2 mm.; width, 16 mm. (The rostral extends more to the upper surface than is shown.)

small, scarcely distinguishable from granular scales of lower eyelid; six superciliaries, the anterior twice as long as wide, more than half size of the anterior supraocular; last superciliary large, vertically placed (lateral view), generally resembling a supraocular, but smaller; small triangular preocular, two very small postoculars; palpebrals rather small, separated from superciliaries by two or three rows of granular scales; lower eyelid with a series of three small plates only a little larger than granular scales, which are separated from the pre- and postsubocular series by four or five granular scale rows. Primary temporal about as large as the largest labial, the main axis vertical (in lateral view); upper secondary relatively small, narrow, twice as long as its greatest width; lower secondary very large, its main axis vertical; the tertiary temporal vertical, separated from the upper secondary by a scale, from ear opening by three scales; upper labials eight, the first smallest, the

rostrolabial suture directly below nostril; the first two labials in contact with nasal; five labials preceding the subocular labial, which is as high as long; seventh labial larger and higher than eighth; latter scale only a little longer than high, separated from auricular opening by a distance greater than its length; three pairs of postlabials, diminishing in size; four well-developed, sharply denticulate lobules in front of ear, directed backwards; 24-26 scales around ear; mental with a labial border equal to that of rostral; two well-developed postmental shields, followed by three pairs of chinshields, none of which are in contact; postgenial small, bordered on the inner side by a scale of equal size and shape; seven lower labials.

Scale rows generally parallel, in 24 rows about the middle of body; 33 scales about neck behind ear; 27-28 on narrower part of neck; about 19 scales around base of tail; two median dorsal rows widened, the rows low on sides smallest; eight scales border the anus, the median pair enlarged, the median scales overlapping the adjoining outer scales; lateral postanal scale strongly differentiated, rounded and raised; subcaudals much widened; tail vertically compressed; seventeen scales about arm at insertion; an area of small imbricating scales in the axilla; no well-defined outer wrist tubercle; numerous large padlike tubercles on base of palm, the tubercles growing smaller towards base of digits; lamellar formula for fingers: 6; 9; 11; 10; 7; the intercalated scales on fingers are on base only, save on the second finger, where a series extends to claw between upper and lower scales on the outer side of digit; about 25 scales around leg at insertion; behind insertion of limb numerous small scales; when the legs are moved back a small pocket is formed on each side of the anus. In the middle of heel two enlarged plates; the scales on under surface of foot conical, slightly juxtaposed or slightly imbricating. Lamellar formula for toes: 6; 9; 9; 16; 9; toes covered generally by two rows of scales save on outer side of the three inner toes, where there is an intercalated row of scales extending completely or almost to claw; one or two at base of other toes.

Color. Above brown to amber-brown, the color varying in intensity; the brown color is more intense on outer edges of the two median scale rows, and gives the impression of two dim, darker lines separated by a median that is somewhat lighter, with each darker line bounded laterally by a slightly lighter stripe; a narrow, more or less distinct cream or white lateral stripe, not evident anterior to ear; below this a brownish-gray stripe fading into the ground color of the ventral surfaces.

On the back one notes two series of lighter markings. On the first and third scale rows are very dim lighter markings on the outer half (or third) of alternate scales, while on the third row the spots may be the size of the scale on alternate scales. These are only dimly visible (more distinct in K. U. 11021). Aside from this series of markings are series of small white dots and dashes which form dotted lines on each of the eight dorsal scale rows, the dots on the median scale rows on every other scale, those on others on each scale; these flecks continued to near tip of tail, but here they are more scattered and suggest dim annulations, the scales bearing the dots likewise being browner than adjoining scales.

Measurements of *Eumeces pavimentatus* (Geoffroy-St. Hillaire)

Museum Number¶ Sex	K.U. 11021 ♂	K.U. 11022 ♀	A.N.S.P. 9661 ?
Snout to vent	136	134	79
Tail	209*	145†	148
Snout to eye	9	9.2	6.3
Snout to ear	22	22	16.6
Snout to foreleg	42	43	24
Axilla to groin	80	85	46
Width of head	17.5	16	11.8
Length of head	21	19.2	14
Width of body	17	20	.....
Postanal tail width	14	12	8
Foreleg	35	33	22
Hind leg	59	54	31.6
Longest toe	19.5	18	11

* Broken. † Regenerated. ¶ Nos. 11021, 11022, "Haiffa, Syria"; 9661, unknown locality.

Variation. Only three specimens have been available for examination, and two agree quite remarkably in markings and scale characters. A few variations, however, are evident: superciliaries 7-7, 6-6 and 5-5; lamellae under fourth toe 13-14, 16-16, 15-16; scales from occiput to above anus 66, 66, 68. In coloration but little difference is noted. The smaller specimen has the head covered above with white dots, only dimly evident in the adults; there is a suggestion of vertical lines behind the ear. A curious anomally occurs in this smaller specimen. The frontoparietals are completely wanting, apparently fused with the adjoining scales. In this specimen, too, the first pair of chinshields are in contact

and the postgenial is proportionally larger than the adjoining scale. There are 126 subcaudal scales in the complete tail.

Remarks. This form differs from the typical *schneiderii* in a more slender head and body; with a proportionally longer hind leg; the limbs touching when adpressed or, in younger specimens, strongly overlapping (in A.N.S.P. No. 9661 they overlap the width of nine scales). The nasal is apparently not completely divided and the first pair of chinshields are not in contact medially. The markings and color are not distinctive.

Distribution. This species is probably confined to Egypt, Syria and closely adjacent territory, and it appears to overlap territory occupied by certain other forms of the group.

Locality records:

SYRIA: "Haiffa" (K.U.2); Sarona near Jaffa (Senckenberg 2).
EGYPT: (Geoffroy-St. Hillaire type; present location of type uncertain).

Eumeces princeps (Eichwald)

(Plate 3, fig. 3; Figs. 10, 14)

SYNONYMY

1839. *Euprepes princeps* Eichwald. Bull. Soc. Imp. Nat. Moscow, II, 1839, pp. 303-307 (type locality "In ora Caspia occidentali, ad montes praesertim Talyschensis"; type probably in Moscow); and Faun. Caspia-Cauc., 1841, pp. 93, 116, pl. XVI, figs. 1, 2, 3; Severtzoff, Nacht. Ges. Moscow, VIII, pt. 2, 1873, p. 72; Nikolsky, Trans. St. Peters. Nat. Soc., XVII, 1886, p. 406; Zarudny, Bull. Soc. Imp. Nat. Moscow, 1890, p. 295 (Murgab, Tedjent in oases of Merve and Peunde).

(The association of further references to the synonymy of this species must needs await an examination of the materials on which the records were made. Mere geographical probability will not suffice as a basis, inasmuch as there is likelihood that the territories occupied by certain forms overlap, nor will the meager details published suffice.)

History. This species was very early referred to synonymy either under the name *Eumeces schneiderii* or *Eumeces pavimentatus*, being used only by certain Russian authors. It was revived by Mertens in 1924, but it is doubtful that the forms associated under it actually belong to Eichwald's species. In the same year Mertens placed the name in the synonymy of *Eumeces schneiderii schneiderii* (Daudin).

Diagnosis. Above nearly uniformly brownish slate to lavender, the scales showing some scattered gray flecks. An indistinct, narrow, lateral cream line beginning on the posterior labials can be traced through the ear and along the sides to the groin on the sixth and seventh scale rows; below this line, grayish, becoming somewhat lighter below. Tail above lighter than body; mental with distinctly wider labial border than rostral; presuboculars elongate and very narrow.

Description of species (from K.U. No. 11020, Transcaspia ♀). Rostral high, extending as far back on the snout as a line connecting the middle of the nasals; the part visible above equally as large as the frontonasal; supranasals moderately large, in contact medially for half their width; frontonasal much wider than deep, touching the anterior loreals; prefrontals large, much larger than the frontoparietals; frontal narrow, a little longer than its distance from the end of the snout (in *pavimentatus* much longer [.5 mm. to 2.3 mm.]), the anterior angles more obtuse than in *pavimentatus;* frontoparietals in contact rather narrowly, the transverse width as great

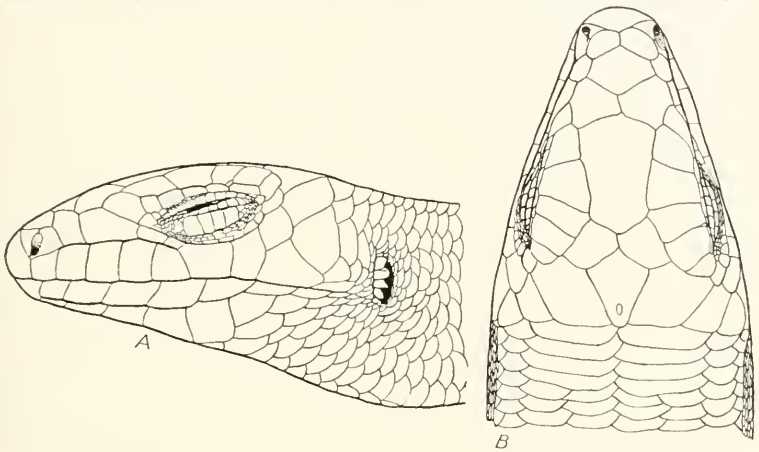


FIG. 14. *Eumeces princeps* (Eichwald). K.U. No. 11020; Transcaspia. A, lateral view of head; B, dorsal view of head. Actual head length, 18.2 mm.; width, 15 mm.

as the length (longer than wide in *pavimentatus*); interparietal rather large, with as great a length as the parietals; parietals large, very wide; four pairs of narrow, widened nuchals.

Nasal large, divided by sutures, one from rostral to nostril, and one from supranasal to the nostril, the upper moiety nearly twice as large as that in *pavimentatus;* no postnasal; anterior loreal higher than posterior; the latter much longer than high, the upper edge horizontal, much narrowed posteriorly; preocular small; presuboculars relatively elongated and narrow; seven superciliaries, the anterior larger than posterior; palpebral scales separated from middle superciliaries by a row of scales as large as or larger than palpebrals; and anteriorly and posteriorly by a second series which is inconspicuous medially; four large plates on lower eyelid (much more elongate than in *pavimentatus*), separated from the suboecular

by five scale rows; seven postsuboculars, which reach to the presuboculars, forming an unequal but practically continuous series; two small postoculars; four supraoculars.

Primary temporal very distinctly smaller than in *pavimentatus*, its area less than half the upper secondary temporal; lower secondary temporal moderately large, with an area not or only slightly larger than that of upper secondary, and much higher than long; tertiary temporal narrow, high, separated from the upper secondary by a scale, from the ear lobules by one vertically elongate scale and one smaller scale (in *pavimentatus* by three or four scales).

Eight upper labials, first smallest, seventh highest, its area about equal to that of eighth; eighth labial separated from the ear lobules by about four rather irregular scales, the lower scale in contact with the labial largest; mental with a labial border much greater than that of rostral; two postmentals (the posterior broken on right side; the part broken is fused with the first chinshield); normal chinshields on right side three, the second narrower and much broader than other two; the postgenial smaller and shorter than scale bordering it on its inner side and likewise in contact with the third chinshield; five or six lower labials; ear opening with four large lobules, their bases strongly overlapping; about 22 scales around ear.

The scales on sides of body slightly diagonal in axillary region, but parallel farther back; the scales of the two median rows much wider than the adjoining, which in turn are larger than the third row; scales on side much smaller than the dorsal scales or ventral scales; 28 scale rows around narrow part of neck; 34 in axillary region; 26 about middle of body; 20 about base of tail at first widened subcaudal.

Eight anal plates; the median pair very large, overlapping outer scales, and each in turn overlapping the scale touching its outer border; a group of small granular scales in the axilla; a group of granules posterior to the insertion of the hind limb, extending to the sides of anus, and when leg is pulled back, a small pocket is formed beside the anus; lateral postanal in female large and fairly well differentiated (probably much more so in male); 64 scales from parietal to above anus; 110 + subcaudals (tip of tail missing and probably five to eight subcaudals).

Body slender, elongate; limbs well-developed, overlapping but slightly when adpressed; digits with terminal lamellae not tightly bound about claw; palm with a series of larger scales diminishing in size distally, separated from bases of digits by several series of

small granules; lamellar formula for fingers: 5; 8; 10; 12; 6. Claws very long (perhaps due to captivity); heel plates forming an unbroken series from basal lamellae of inner toe around to base of outer toe; scales on sole only slightly enlarged; lamellar formula for toes: 5; 8; 10; 14; 9.

An intercalated series of scales between the dorsal scales and the ventral lamellae of toes, on the outer side of the first and second toes, and the inner side of the fifth toe; on third and fourth toes they are on the basal part of the outer side only; on the first, second and third toes the intercalated scales extend the length of the toes on the outer side; on the fourth they are absent only on distal phalanx, and are present on the inner side of the fifth.

Color (in alcohol). As in diagnosis. Limbs much browner and lighter than dorsal color of body; the tail gradually becoming lighter toward tip; ear lobules light; upper labials light brownish on lower part, dark slate on upper part; the supraocular region lighter than the median region of the head.

Measurements of *Eumeces princeps* (Eichwald)

Museum Number	K.U. 11020
Snout to vent	125
Tail	193*
Snout to eye	7.5
Snout to ear	22
Snout to foreleg	36
Axilla to groin	75
Length of head	18.2
Width of head	15
Foreleg	32
Hind leg	47
Longest toe	15
Anal tail width	12.5
Width of body	20

* Extreme tip missing.

Variation. Only the single specimen has been available for study.

Distribution. Known definitely from the region south of the Caspian Sea. It probably occurs in Transcaspia to Bokhara and northern Persia.

Eumeces zarudnyi Nikolsky

(Fig. 10)

SYNONYMY

1899. *Eumeces zarudnyi* Nikolsky. Ann. Mus. Zool., 4, 1899, p. 399 (type description in Latin; type locality Seistan and Kirman in Eastern Persia, Zarudny Coll.); Yearb. Zoöl. Mus. Imp. Acad. Sci. St. Petersburg, IV, 1899, p. 400 (description in Russian; I am uncertain which of these two descriptions was first published; both bear the date 1899).

History. The three cotypes of this species were collected by N. A. Zarudny on an expedition into Persia. The localities given are as follows: No. 9339,* Buzman (Urbs Busman) in Eastern Kirman; No. 9340, Labeab in Seistan; No. 9341, Schur-ab in eastern Kirman. The description, while brief and lacking detail on very numerous important points, does seem to point to a form worthy of either specific or subspecific recognition. Unfortunately, I have seen no specimen referable to this species.

The comparison given is with *E. schneiderii,* but just what form Nikolsky has in mind I cannot say since he (Nikolsky, 1905) places both *princeps* and *pavimentatus* as synonyms of *schneiderii.*

Diagnosis. Related to *schneiderii;* the hind limb about two to two and one fifth times in length from snout to vent; anterior loreal one and one half times as high as wide; frontonasal as long as wide; no postnasal. Scales in 26 rows.

Description of the species (from Nikolsky). Nasal scales touching two anterior labials; nostril above the anterior third of the first labial; postnasal wanting; four supraoculars; (the description notes five supraoculars, but it appears likely that the last large superciliary is regarded as the fifth); frontonasal as long as wide or length less than width; three supraoculars touch the frontal; parietals not in contact behind the interparietal; ear opening large, the anterior edge with five-six acute lobules; diameter of the ear is scarcely less than the longitudinal diameter of the eye; two unpaired postmental scutes.

Dorsal scales of the body smooth, arranged in 26 longitudinal rows; lateral scales smaller; scales of four longitudinal vertebral rows much larger than the abdominal scales; scales of the two middle vertebral rows twice as wide as long; with limbs adpressed, the toes touch carpus of front foot; subcaudals widened.

Color. Body brownish-gray above, yellowish-white below; base of tail red above; a white lateral stripe passes from eye through ear to femur.

* I designate this specimen as the lectotype.

Measurements of *Eumeces zarudnyi* Nikolsky

Total length	347	Length of foreleg	36
Tail	236	Length of hind leg	52
Width of head	20		

Remarks. Whether the specimens mentioned by Blanford (1872) belong to this species I cannot say, but it seems likely that they approach closer to this form than to the real *pavimentatus*. These specimens, nine in all, were collected in southern Persia (save one at Pishin, Baluchistan). All the specimens from Persia have 26 scale rows. The only other scale data is as follow: "The foreleg when laid forward in some specimens only reaches the eye, in others it extends to the end of the snout. The nasal shield is divided in all my specimens, and two central rows of dorsal scales are broader than the others . . . The color is olive gray or sandy gray, with at times golden yellow longitudinal stripes, varying in breadth and distribution, down the sides. In two specimens from Sarjan there are dusky longitudinal bands down the back and sides."

The specimens concerned are two from Sarjan near Karman (Kirman), southern Persia, 5,500 feet, and six specimens from Niriz, east of Shiraz, southern Persia, 4,000-6,000 feet elevation.

The specimen from Pishin, Baluchistan, has 28 scale rows.

It is quite likely that the specimens from Waziristan noted by Ingoldsby and Proctor (1923) may likewise belong close to this form, or represent a distinct species.

Distribution. Known only from the type series from Kirman and Seistan.

Eumeces blythianus (Anderson)

(Plate 8)

SYNONYMY

1871. *Mabouia blythiana* Anderson. Proc. Asiat. Soc. Bengal, 1871, p. 186 (type description; type locality [?] Amritzur, Punjab; Purchased from a Bokhara merchant, who stated it was obtained at Amritzur).

1876. *Eumeces blythianus* Theobald. Desc. Cat. Rept. British India, 1876, p. 66 and p. X, synopsis (short description taken from type description); Blanford, Eastern Persia, Vol. II (Zoölogy and Geology), 1870-1872, p. 388; Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 385 (redescription of type); Boulenger, Fauna of Brit. India, Reptiles, 1890, p. 222 (redescription of type); Finn, Proc. Asiatic Soc. Bengal, July, 1898, pp. 189-190; Annandale, Journ. Asiat. Soc. Bengal, New Series, I, No. 5, May, 1905, p. 150 (type locality listed); Boulenger, Proc. Zoöl. Soc. London, 1898, p. 722 (Afridi Country, Green Coll.); Mertens, Senckenbergiana, Bd. 2, Heft. 6, 1920, p. 179.

History. This species has been known for more than sixty years, having been described by Anderson in 1871 from a specimen obtained from a merchant from Bokhara, who stated he had obtained it at Amritzur, Punjab. Most of the data published after this time on this species has been derived from this carefully made type

description. Practically nothing new has been learned of the form. A new locality was added by Finn (1898): Afridi Country (Green, Collector).

The data incorporated here are drawn chiefly from two photographs of this last mentioned specimen, prepared for me by Mr. H. W. Parker of the British Museum. These photographs are remarkably clear and only a few characters cannot be ascertained owing to the position of the body. A few data are taken from the type description.

Diagnosis. A member of the *Schneiderii* group, the dorsal region olive-brown, with three brown stripes. A well-defined dark brown stripe on the side, bordered below by a clearly defined, broad, yellowish line; limbs well-developed, overlapping when adpressed. One postmental; no postnasal; prefrontals in contact; 30 scale rows about the middle of the body; the two median dorsal rows greatly widened; frontoparietals forming a broad suture; interparietal large, not inclosed by the parietals; about 60 scales from parietals to above vent. (Character of anals unknown but presumably as in other members of the *Schneiderii* group, with median overlapping outer.)

Description (drawn from type description and data on a specimen in the British Museum of Natural History [No. 98, 7, 12, 1]). Rostral triangular, hexagonal, separated from the frontonasal by supranasals, which form a broad suture; frontonasal wider than long, separated from the loreal (touches loreal in type); prefrontals large, hexagonal, forming a broad median suture, and sutures with the frontal, first supraocular, first superciliary, both loreals and the supranasal; frontal large, much wider anteriorly than posteriorly, the anterior margin forming an obtuse angle; frontoparietals moderate, forming a strong median suture; interparietal large, broad, very sharply truncate behind (wedge-shaped in type); parietals large, widely separated behind interparietal, the right segmented, forming an extra scale between parietal and upper secondary temporal; three pairs of nuchals, the anterior pair largest.

Nasal divided, the anterior part triangular, posterior part subquadrangular; anterior loreal much higher than wide, higher than posterior, touching second and third labials; posterior loreal higher than long; two presuboculars, anterior largest; seven or eight superciliaries, the anterior and posterior largest; primary temporal large; lower secondary temporal triangular, broadly in contact with pri-

mary; upper secondary relatively small; tertiary small, separated from nuchal and upper secondary temporal by a small scale, and followed posteriorly by a rather large scale; eight upper labials, five anterior to the subocular, the first and fifth smallest, eighth largest, distinctly larger than seventh, separated from the auricular opening by numerous scales, its distance from ear greater than its length. Six or seven lower labials; an undivided postmental, followed by three pairs of chinshields, the anterior pair in contact; postgenials rather short. Thirty scale rows about body (in type), the two median much widened transversely, those following the nuchals likewise very wide and much wider than the adjoining second row; 59 or 60 scales in a row from parietals to above anus; two enlarged preanals, with smaller lateral scales; tail rounded, slightly laterally compressed, one and two thirds times as long as the body; a row of enlarged subcaudals.

Ear large, surrounded by 21 scales; four well-developed auricular lobules; limbs well-developed; terminal lamellae not tightly bound about claws.

Color. "Olive-brown above; three dark brown longitudinal lines along the back, from the nape to the base of the tail. A broader dark-brown band from the eye over tympanum, along the side. A broad pale-yellowish band below it from below the eye, through one half of the tympanum along the sides to the groin. A palish dusky band from the angle of the mouth, over the shoulder, and along the side below the yellowish band. Upper surface and sides of tail pale, uniform brownish-olive. All the under parts yellowish."

Measurements* of *Eumeces blythianus* (Anderson)

Total length	240	Forelimb	28
Head	15	Hind limb	38
Body	75	Tail	150

Variation. With the extremely small number of specimens, little can be known about the amount of variation. Blanford (1872), speaking of a series of specimens which he identified as *Eumeces pavimentatus* Geoff., states: "I find 26 scales round the middle of the body in all specimens except one, which is from Pishin in Baluchistan, and has 28, this showing a tendency to a passage into the very closely allied *Mabouia Blythiana* Anderson." It appears that his opinion is based on the key characters of scale rows. I doubt greatly that the species are in reality more closely related

* From Boulenger (1887).

than *schneideri* and *algeriensis*. Finn (1898) mentions "red spots" on his specimens.

Distribution. Known definitely only from the Afridi district, India, Afghan borderland. (Brit. Mus. 1.)

Eumeces algeriensis algeriensis (Peters)

(Plates 9, 10, Figs. 2, 3; Figs. 12, 15)

SYNONYMY

1837. *Scincus cyprius* (non Cuvier) Gervais. Ann. Sci. Nat., (2), VI, 1836 (1837), p. 309 (listed from Barbarie).

1839. *Plestiodon aldrovandii* (part.) Duméril and Bibron. Erp. Gén., V, p. 701; Gervais, Ann. Sci. Nat., (3), 1848, X, pp. 204-205; Duméril, Arch. du Mus., VII, p. 219; Guichenot, Expl. Sci. Algerie Pend. Ann., 1840-1842 (1850), p. 17 (Bône); Duméril, Cat. Rept. Paris Mus., 1851, p. 164 (part.); Eichwald, Nouv. Mém. Soc. Nat. Moscou, (2), IX, 1851, p. 487; Duméril and Duméril, Cat. Meth. Coll. Rept. Mus. Hist. Nat. Paris, 1851, p. 164 (part.) (Bône [Guichenot] and Frontière S-E de Algerie [Pelissier]).

1845. *Plestiodon auratus* Gray. Cat. Liz. British Mus., 1845, p. 91 (part.); Jan, Ann. Mus. Civ. Milano, Ind. Sist. Rett. Anf., 1857, p. 6.

1862. *Plestiodon cyprium* Strauch. Mém. Acad. Imp. Sci., St. Petersbourg, (7), IV, No. 7, 1862, p. 44 (St. Cloud, Le Sig and Arzew).

1864. *Eumeces pavimentatus* var. *algeriensis* Peters. Mon. Königl. Preus. Acad. Wiss. Berlin, 1864, pp. 48-49 ("type description"); Boettger, Abh. Senckenb. Nat. Ges., XIII, 1883, p. 120 (separate p. 28; discussion and numerous localities given).

1873. *Eumeces pavimentatus* (non. Geoffroy-St. Hillaire) Boettger. Abh. Senckenb. Nat. Ges., IX, 1873, p. 140 (separate p. 20) (redescribed from Morocco); Boettger, Ber. Senck. Nat. Ges., 1880-1881, p. 145.

1887. *Eumeces algeriensis* Boulenger. Cat. Liz. British Mus., III, 1887, p. 384 (N-West Africa); Boettger, Cat. Rept. Samm. Mus. Senckenb. Nat. Ges., Teil I, 1893, p. 112 (Casablanca, Ebendaher); Olivier, Mem. Soc. Zoöl. France, 1894, pp. 1-36; Boulenger, Trans. Zoöl. Soc. London, XIII, 1895, p. 136, pl. XVI; Boulenger, Novitates Zoöl., XII, 1905, pp. 73-77 (Dellaïn, Diruchan, Atlas of Morocco); Beddard, Proc. Zoöl. Soc. London, May 16, 1905 (notes on circulation and brain of *Eumeces algeriensis*); Zulueta, Bol. Real Soc. Esp. Hist. Nat., VIII, Dec., 1908, pp. 454-455 (Mogador); Zulueta, *idem*, IX, Julio, 1909, p. 354; Pellegrin, Bull. Soc. Zoöl. France, XXXVII, 1912, pp. 256 and 263 (Fedhalla, Azemmour, Mogador, Fort Gurgens); Hediger, Blätt. für Aquar-Terr-kund, XXXIX, No. 20, 1928, p. (Rabat); Werner, Sitz. Acad. Wiss. Wien. Math-Natur Klasse, Abt. 1, Band 138, Heft 1 and 2, 1929, pp. 14 and 19 (Casablanca); Werner., *idem*. Band 140, Heft 3 and 4, 1931, pp. 292, 293 (Taforalt-Berkane Tiznit, Agadir.); and *idem*, p. 257.

1900. *Eumeces algeriensis algeriensis* Domergue. Bull. Soc. Geog. Arch. Oran, 1900, p. 270, pl. IX.

1920. *Eumeces schneiderii algeriensis* Mertens. Senckenbergiana, II, 1920, pp. 176-179 (discussion; as subspecies); Mertens, *idem*, VI, Heft 5 and 6, Nov. 1, 1924, pp. 182-184.

History. The first published authentic record of this species seems to be that of Paul Gervais (1837), who reported a specimen of *Scincus cyprius* Cuv. collected in Algeria by Doctor Guyon. Duméril and Bibron (1839) mention a specimen from Algeria likewise collected by Doctor Guyon (perhaps the same specimen) under the name *Plestiodon aldrovandii*. Strauch (1862) reports three specimens as *Plestiodon cyprium* from St. Cloud, Le Sig and Arzew, and mentions a specimen collected by Guichenot at Bône

and specimens in the Paris Museum from the southeastern frontier of Algeria collected by Pelissier.

Peters (1865), in a discussion of the genus *Eumeces,* mentions the northwest African specimens as "var. *Algeriensis,*" with scarcely more "description" than to note that the specimen from Persia agrees with the Egyptian form but was separated by shape and certain head scale characters from the variety *algeriensis.*

Boettger (1873) noted the form in Morocco as *Eumeces pavimentatus,* and later (1883) reverts to the name proposed by Peters (*Eumeces pavimentatus algeriensis*).

Boulenger (1887) gave the form full specific rank, as it deserves, and it so has been treated by subsequent authors with the exception of Robert Mertens (1920), who suggests that the west Algerian and Moroccan form is of only subspecific importance, and later (1924) definitely places *algeriensis* as a subspecies of *Eumeces schneiderii* and likewise throws into synonymy Domergue's (1900) *Eumeces algeriensis meridionalis.* The species is treated here with specific rank. There appears to be no intergradation of characters between this and the North African form of *Eumeces schneiderii.* I believe it wise to recognize two forms, *algeriensis algeriensis,* and *a. meridionalis* Domergue.

Boulenger (1895), who discusses the distribution of *algeriensis* and *schneiderii,* shows that *algeriensis* is confined to Morocco and Oran (absent in the Tangiers peninsula, Tangitanian District), while *schneiderii* occurs in Constantine and Tunesia.

One may presume that *algeriensis* is a form long isolated by desert from the eastern stock. The occurrence of *schneiderii* in adjacent territory (possibly overlapping) may be a relatively recent approach due to a lessening of desert conditions along the coast.

Diagnosis. A very large member of the *Schneiderii* group, lacking evidence of longitudinal lines. A series of irregular transverse light bands alternating with similar ocellated bands (reddish in life) on a brown ground color. Four pairs of nuchals; eight or nine upper labials, five or six preceding the suboecular labial; pre- and postsubocular series continuous; upper scales on lower eyelid not or only slightly enlarged; an area of granular juxtaposed scales following the insertion of hind leg, forming a pocket-like depression when leg is folded back; median dorsal scales wider than adjoining scale rows; 28-32 rows about middle of body, the scales more or less keeled; median preanals overlap smaller outer preanal scales; nostril above suture of first labial and rostral; mental with smaller labial

border than rostral; two postmentals; no postnasal; limbs touch or are slightly separated when adpressed.

Description of species. Portion of rostral visible above very large, separating the nasals by a relatively narrow distance, and not extending farther back than highest point of nasals; supranasals placed diagonally, forming a median suture; frontonasal relatively small, a little wider than long, in contact laterally with the anterior loreal, not or but slightly larger than a prefrontal; prefrontals forming a broad median suture, and sutures with the frontal, frontonasal, posterior loreal, anterior loreal, first superciliary, and first supraocular, their length in the order named; frontal not or

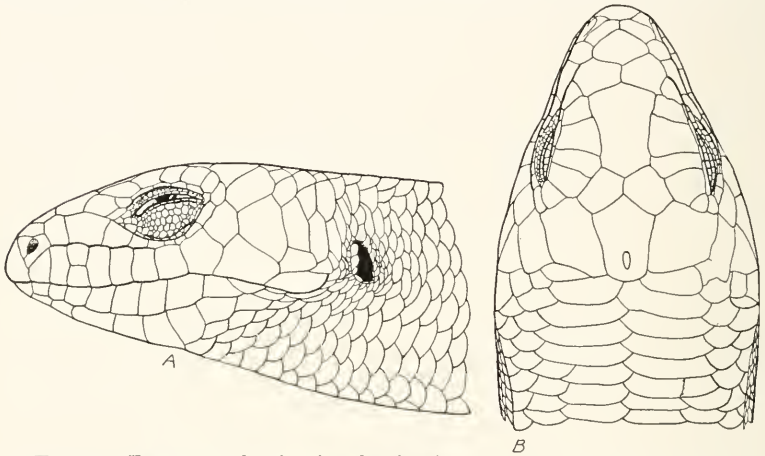


FIG. 15. *Eumeces algeriensis algeriensis* (Peters). K.U. No. 11019; Casablanca, Morocco. A, lateral view of head; B, dorsal view of head. Actual head length, 30 mm.; width, 29 mm.

scarcely angular anteriorly, the sides somewhat concave posteriorly, touching three supraoculars; frontoparietals quadrangular, forming a median suture; interparietal short, truncate posteriorly; parietals rather transversely placed, wider than long, not in contact behind interparietal; four (or five) pairs of nuchals (in one specimen the posterior part of the left parietal segmented and a small intercalated scale between the first pair of nuchals).

Nasal large, divided by two grooves, one running from nostril to supranasal and another to the rostral, wedged between the rostral and first labial, in contact with the second labial; anterior loreal little higher than posterior loreal; latter as high as long; the presuboculars and postsuboculars forming a continuous series; four supraoculars; six superciliaries, the anterior and posterior large,

approaching the first supraocular in size; primary temporal large (divided on left side in one); upper secondary quadrangular, not as large as the lower secondary temporal, which forms a broad suture with the anterior; tertiary temporal present, single (or divided into two parts on left side); nine (or eight) upper labials, the first much the smallest, its suture with the rostral less than half the height of the scale, separated from the anterior loreal; seven or eight lower labials; last large labial followed by a pair of large postlabials, the lower of the two much the larger, and might be mistaken for one of the labial series; these followed by four vertical rows of scales diminishing in size as the ear is approached; four well-defined ear lobules, more or less rounded behind; mental small, the labial border much less than that of the rostral; two postmentals, the posterior much the larger, and (abnormally) partially fused with the first pair of chinshields; three pairs of chinshields, all separated, third followed by a short and broad postgenial; this latter followed by a second, more elongated scale.

Upper eyelid well-developed, the upper palpebral scales separated from the superciliaries by four or five rows of granules; scales bordering the lower palpebral scales not or only slightly enlarged, separated from the subocular by six or seven rows of granules and the subocular series; ear surrounded by about twenty scales.

Scales on the body in longitudinal rows, the median series distinctly widened; about 70 scales from occiput to above anus; 38 scales about neck behind ear; 33 about constricted portion of neck; 45 about body at axillary region; 30 about the middle of body; 24 about base of tail; dorsal, and ventral scales to a lesser extent, wrinkled or keeled; head scales somewhat rugose.

Limbs well-developed. Twenty-eight scales about the insertion of forearm; scales in axillary region granular; wrist without a well-defined tubercle, this area being covered with four scales of equal size; scales of forearm merge gradually into the rounded flattened tubercles of palm, which are subequal over much of the surface; lamellar formula of fingers: 6; 10; 12; 13; 8. Fingers with an intercalated series of scales on outer side (except fifth, on inner side); the terminal lamellae not tightly bound about the claws; about 34 scales around the insertion of the hind leg, an area of small granular scales forming a shallow pocket behind insertion; toes with an intercalated series of scales on outer side. Lamellar formula of toes: 7; 11; 13; 14; 9; scales of leg gradually merge into the rounded

flattened tubercles of heel and sole, which gradually become smaller and more imbricating toward the base of the median toes. Six preanal scales, the median pair much enlarged, overlapping the adjoining scale, which in turn overlaps the very small, scarcely differentiated outermost scale; lateral postanal scale differentiated noticeably, its surfaces raised and rounded; subcaudal scales much widened (normally about 34 scales). Head much widened posteriorly.

Color (in alcohol). Above, brown to tan; the head generally more orange-brown on anterior part; beginning on shoulder the body is traversed by irregular light bands about one scale wide, separated by three scale rows, but growing wider low on sides; the median of these three rows bears a transverse band of somewhat ocellated spots. Rostral, nasal and anterior labials light. A light cream spot on seventh and eighth labials, another anterior to ear; two or three vertical spots of cream on side of neck, the anterior partially involving the ear; limbs and tail of a lighter tan than body; all ventral surfaces dull cream.

Measurements of *Eumeces algeriensis algeriensis* (Peters)

Museum Number†	M.C.Z. 4159	M.C.Z. 31449	Kas. 11019	Phil. 12123	U.S.N.M. 37290	Mich. 65763	Phil. 12122	M.C.Z. 31450
Total length	285*	358	381*	.....	.....	305*	.....	.....
Snout to vent	122	163	173	175	180	185	185	185
Snout to eye	9.5	10	13	11	.....	.....	11.5	14
Snout to ear	29	29	36	35	.....	.....	38	37
Snout to foreleg	41	48	54	57	55	55	54	61
Tail	163	195	208	.....	.....	220	.....	.....
Width of head	23	38	29	23	35	30	30	32
Length of head	23	33	30	30	33	32	31	33
Width of body	.....	.....	36	.....	40	.....	.....	.....
Foreleg	38	43	49	47	46	50	49	48
Hind leg	46	49	60	56	53	58	60	54
Longest toe	14	15	20	17	20	16	18.2	16
Postanal tail width	15	.....	21	20	23	23	18	21
Axilla to groin	65	68	92	97	107	100	95	95

* Tip missing or regenerated.

† 4159, N. Africa; 31449 and 31450, Taforalt; 11019, Casablanca, Mor.; 12123, 12122, West Africa; 37290, Oran, Algeria; 65763, West Africa; 31450, Maraaf, near Casablanca, Mor.

Variation. The largest specimen examined measures 207 mm. snout to vent (locality uncertain; A.N.S.P. No. 9386). The number of subcaudals varies from 83 to 86 in the specimens with perfect tail, 85 in one with the extreme tip regenerated. The parietals are inclosed in none.

In ten specimens, the scales from parietals to above anus vary between 66 and 71, the number 66 occurring twice, 67 four times, 68 once, 69 once, 70 once, and 71 once. The scale rows on neck vary from 29 to 33, the average being about 31; scale rows about the middle of the body 28 to 30, 28 occurring twice, 29 once, and 30 seven times. Scales about base of tail vary from 20 to 26. The labials are usually 8-8, the number 9-9 occurring twice, and 8-9 once. The nuchals are usually 5-5, 5-4 occurring three times and 4-4 once. Invariably two postmentals and no postnasals occur.

Superciliaries five to seven, the usual number being 5-5; 7-7 occurs twice. There are either four or three ear lobules, three being a little more frequent. The frontonasal is never in contact with the frontal. Subdigital lamellae under fourth toe eleven to fourteen, 11 occurring twice, 12 five times, 13 five times and 14 seven times. The primary temporal tends to divide, this condition being present in five specimens.

Distribution. This subspecies appears to be confined to the countries of Morocco and western Algeria, north of the Sahara.

Locality records:

MOROCCO: Mogador (Brit. Mus. 1) (Zulueta, 1908; numerous specimens) (Pellegrin, 1912) (Boettger, 1883); Dellaïn, Diruchan, Atlas of Morocco (Boulenger, 1905); Melilla (Zulueta, 1909, 1 spec.); Fedhalla (Pellegrin, 1912); Azemmour (Pellegrin, 1912); Fort Gurgens (Pellegrin, 1912); Salé Oved (Pellegrin, 1912); Ykem Taläint (Pellegrin, 1912); Anti-Atlas, 650 meters (Pellegrin, 1912); Morocco (Brit. Mus. 1); Rabat (Hediger, 1928) (Pellegrin, 1912); Casablanca (K.U. 1) (Boettger, 1883) (Werner, 1929).

ALGERIA: Oran (Brit. Mus. 1) (Paris Mus. 1) (U.S.N.M. 1); St. Cloud (Strauch, 1862); Le Sig (Strauch, 1862); Arzew (Strauch, 1862); Bône (Guichenot, 1850); Fleurus (Oran Mus.) Taforalt (M.C.Z. 1); Chapelle Santa-Cruz (Domergue, 1900); Djebel Yeffry (Domergue, 1900); Saint-Lucien (Domergue, 1900); Klèber (Domergue, 1900); Saint Leu (Domergue, 1900); Aïn-Témouchent (Domergue, 1900); Lamoriciere (Domergue, 1900).

Unidentified localities: Northwest Africa (Brit. Mus. 5); West Africa (A.N.S.P. 2) (Mich. U. 1); North Africa (M.C.Z. 1).

Eumeces algeriensis meridionalis Domergue

(Fig. 12)

SYNONYMY

1900. *Eumeces algeriensis* var. *meridionalis* Domergue. Soc. Geog. Arch. Prov. Oran, XX, 1900, p. 272, pl. XVI, fig. 3 (type description; type locality, Ain Sefra); Werner, Sitz. Kaiserl. Akad. Wiss. Math., Natur. Klasse Wien., CXXIII, pt. IV, Apr., 1914, pp. 352, 354, 356; and ibid, CXXXVIII Band, Abt. I, Heft 1 and 2, 1929, p. 11 (Ain Sefra).

History. This form was first recognized by Domergue (1900) in his work on the Herpetology of Oran, and very briefly characterized. The characters chosen to distinguish the form are those based on the "*sousoculaires*" (the pre- and postsuboculars), the first superciliary, and the ear lobules. The type specimen is very young, "de 11 et 15 mm." Domergue states that three adult examples were later received from M. Gaston Buchet from Cap Sim (Mogador), which he refers to the same variety. Whether his reference of these specimens to *meridionalis* can be taken so that they can be regarded as part of the type series I do not know. If so, I propose to designate the smaller, Ain Sefra, specimen as the lectotype, as there may be some doubt as to whether the two forms should be regarded as the same subspecies.

Diagnosis. Related to *algeriensis algeriensis* but differing in having a lower number of scales (usually six or seven less) from occiput to above vent; a reduction in the number of nuchals (usually only a single pair instead of four or five). Two or four scale rows less about the tail at base; a higher number of superciliaries (usually 8-8); 8-10 scales in the combined pre- and postsubocular series; these narrow and elongate instead of nearly square.

Scales, in 27 or 28 rows about middle of body; upper labials, 8-8; postmentals, two; no postnasal; subdigital lamellae under fourth toe 18; an area of granular scales posterior to insertion of hind leg; inner preanals overlap outer scales.

The markings are generally similar to those of *algeriensis.*

Variation. Among the three topotypes from Ain Sefra in the Harvard Museum of Comparative Zoölogy, there is a rather negligible amount of variation. The scales from parietals to above anus are 62, 62, 60. Scales about the narrow part of neck are 30, 29, 30; in axillary region, 36, 36, 36; around middle of body, 28, 27, 28; upper labials, 8-8, 8-8, 8-8. (On the last specimen the eighth labial on one side is broken); scales around ear, 19, 19, 20. The supraoculars are in the first 4-5, one scale being broken; in the second the supraoculars are badly broken; in the third they are normally 4-4;

Measurements of *Eumeces algeriensis meridionalis* Domergue

Museum Number	M.C.Z. 27455	M.C.Z. 27454	M.C.Z. 27453
Snout to vent	124	119	87
Tail	176*	132*	119
Snout to eye	8	8	7
Snout to ear	23	24	19
Snout to foreleg	40	37	29
Axilla to groin	67	63	45
Width of head	22	21	16
Length of head	23	22	17
Postanal width	17	14	9
Foreleg	34	30	25
Hind leg	44	39	33
Longest toe	12	11.5	11

* Regenerated.

postmentals invariable; behind anus, only one or two divided subcaudals, followed by 93 (in smallest) widened subcaudals; prefrontals invariably in contact; three supraoculars (normally touch frontal); pre- and postsuboecular series 8-9, 9-10, 7-9. The temporals and posterior labials are much the same, save that in the first and largest, the upper secondary temporal is divided abnormally.

Color variation. No. 27455. Light transverse bars strongly evident; the ocellated lines dimly indicated; white lateral spots continuous with the transverse bars; top of head strongly dotted with brown. Ground color olive, tail lighter in color than body. Neck spots dim.

No. 27454. Same as the preceding, but the ocellated lines more distinct; head heavily spotted, rostral brown. Nasal, supranasals light without spots; labials light with some white blotches.

No. 27453. The lines of ocelli extend as far as nuchals; 17 or 18 light transverse lines; ten or twelve lateral spots continuous with the transverse lines; tail distinctly banded with lighter.

It appears that the three specimens listed here are those mentioned by Werner (1929), although there are slight discrepancies in the measurements.

Distribution. This subspecies is known from the type locality, Ain Sefra. Domergue has placed in the subspecies specimens from Mogador, but this association may be questioned until verified by other material from this locality.

LONGIROSTRIS GROUP

A single species, *Eumeces longirostris,* is included, characterized by dorsolateral and lateral light lines, which become more or less lost in the adult; the scale rows on the sides are in diagonal rather than in parallel rows; a postnasal; a single, undivided postmental; scales in 32-36 rows; four supraoculars; three pairs of chinshields; limbs elongate, strongly overlapping when adpressed (in adults); eight (or ten) scales border anterior edge of anus; outer two or three small, the third or fourth somewhat larger, overlapping the median enlarged anals and the adjoining outer anal scale. A group of small scales behind insertion of hind leg.

The single isolated species, *Eumeces longirostris* (Cope), considered in this group, combines features that are characteristic of certain other groups, as, for example, the complete separation of the palpebrals from the superciliaries; the group of smaller scales following the insertion of the hind leg; and the much enlarged lower secondary temporal, all suggest characters occurring in members of the *Schneiderii* group. However, it differs from these in many of their most typical characters.

It has the general color pattern of the *Skiltonianus* or *Anthracinus* groups, but differs in the character of the preanal scales, the squamation of the digits, the general character (shape) of the temporals, the general contours of the body, longer legs, the much greater number of scale rows, and their direction of growth on the sides. In this latter character, the diagonal rows of scales, it agrees with *obsoletus,* but here the resemblance ceases. From the *Fasciatus* group, which occupies the territory along the Atlantic coast, it differs in most of the diagnostic characters.

Should we hypothesize that it is a form that has reached the Bermudas from continental America, derived from some form now living, we would have to consider these unique modifications as an immediate result of restriction to a low oceanic island and the intricate interplay of associated environmental factors which have acted as the stimulus for the mutations or have selected them. I am inclined to the opinion that it is a relic of the more ancient dissemination of the group (genus) as evidenced by the presence of the *Schwartzei* group in Mexico and Central America, with the most closely related *Taeniolatus* group in the Central and Western Asiatic regions. It may be regarded as a form contemporaneous with the ancestors of the present *Fasciatus, Anthracinus* and *Skil-*

tonianus groups, that has maintained its primitive characters due to its long sojourn in an environment that has in all probability changed but little since its arrival.

Eumeces longirostris (Cope)

(Plate 11; Figs. 16, 17)

SYNONYMY

1859. *Scincus* related to *S. fasciatus*, Jones. Naturalist in Bermuda.
1860. *Scincus fasciatus* Godet. Bermuda, 1860, p. 251.
1860. *Scincus ocellatus* Godet. Bermuda, 1860, p. 251.
1861. *Plestiodon longirostris* Cope. Proc. Acad. Nat. Sci. Phila., Oct., 1861, pp. 312-314 (type description; type locality, Bermuda); Garman, Bull. Essex Inst., XVI, Jan. 9, 1884, p. 15 (under *Eumeces*); Stejneger and Barbour, Checklist N. Amer. Amph. Rept., 1917, p. 70.
1875. *Eumeces longirostris* Cope. Bull. U. S. Nat. Mus., No. 1, 1875, p. 45 (Bermuda Islands); Goode, Amer. Jour. Sci., 1877, p. 290; Garman, Bull. U. S. Nat. Mus., No. 25, 1885, part 4, Rept. Bermuda, pp. 287-289 (detailed history and description of the species); Boulenger, Cat. Liz. Brit. Mus., III, 1887, pp. 368-369; Cope, Ann. Rep. U. S. Nat. Mus., 1898 (1900), pp. 631-632, fig. 124; Fowler, Proc. Acad. Nat. Sci. Phila., LXVII, Apr., 1915, p. 254 (Ducking Stool, Bermuda); Stejneger and Barbour, Checklist N. Amer. Amph. Rept., 2d Ed., 1923, p. 76; *idem*, 3d Ed., 1933, p. 31.

History. This species appears to have been first noticed by Mr. Jones, in 1859, in "The Naturalist in Bermuda." He reported it as common, while former writers had either not mentioned it or stated that lizards did not occur. D. T. L. Godet, in "Bermuda," in 1860, mentioned two species, *Scincus fasciatus* and *Scincus ocellatus*. It would appear that he mistook old males for the *ocellatus*, and the young blue-tailed ones for the *Scincus fasciatus*.

In 1861 Cope described the species under the name *Plestiodon longirostris*, giving a careful description, and comparing the form with *Plestiodon laticeps*.

Garman (1885) gives a good description and reviews the history of the species. He calls attention to the fact that Captain John Smith, of colonial fame, reported "large" lizards on the islands in earlier times, but at the time of his writing they were extinct, having been killed by cats. Garman is uncertain whether the author might be referring to this species or to a larger insular species such as occurs now in the Galapagos Islands. The term "large" is or may be very relative, and unfortunately no standard of size is given.

The six types were collected by J. H. Darrell, who sent them to the U. S. National Museum. The type locality is "Bermuda."

Later, Yarrow (1882) reports another specimen in the United States National Museum, collected by G. Brown Goode. In 1887, Boulenger describes the form from a lot of four specimens obtained in Bermuda by the Challenger Expedition. Since that time large

series have reached Eastern Museums, collected by Philip Pope, L. S. Mobray, E. Q. Vanatta, T. H. Bean, R. L. Ditmars, T. Barbour, Mr. Gross and E. L. Mark.

The six types are catalogued under U.S.N.M. No. 4737. I designate the largest specimen, having a body length of 71 millimeters and a tail length of approximately 76 millimeters, as the lectotype. The series is in good condition.

Diagnosis. *Eumeces longirostris* is a medium-sized species of the genus, reaching a body length of 80 mm., characterized by a dorsolateral line beginning above the first superciliary and continuing to base of tail; a lateral line beginning on the anterior labials and continuing to tail, sometimes broken on side of neck; evidence of a sublateral line in young. Scales small, in 32-36 rows around body, the dorsal and lateral scales smaller than ventrals, the laterals smallest, and arranged in distinct diagonal rows on the sides of body; a postnasal present; the postmental undivided; limbs long, strongly overlapping (18 millimeters in adults) when adpressed; four supraoculars, three touching the frontal; a large pair of nuchals, sometimes followed by a second very narrow pair; seven or eight upper labials, four or five preceding the subocular. The typical lines are lost in old specimens.

Description of species. Rostral distinctly wider than high (2 mm. to 2½ mm.), forming an angle behind; supranasals relatively very large, forming a broad median suture, touching nasal and postnasal laterally, the first loreal and frontonasal posteriorly; the suture with the loreal less than half that with the frontonasal; frontonasal much broader than long, forming sutures with the anterior loreals; prefrontals large, very wide, forming a median suture equal to half their width, laterally in contact with the two loreals, the suture with the first less than half that with the second; the suture of the first supraocular large, that of first superciliary small (K.U. 7280 abnormal in having the first superciliary broken and joining with a segment from the first supraocular so that there are five supraoculars on the left side); frontal forming an obtuse angle anteriorly, broadly in contact with the three anterior supraoculars, abruptly pointed behind, separating the frontoparietals and coming in contact with the attenuated end of the interparietal (or with frontoparietals in contact narrowly); parietals not greatly widened, separated widely by the interparietal; one pair of nuchals, normally (rarely two; when present, the anterior much larger but not so wide transversely as the posterior); frontoparietals small, touching two supraoculars.

Nostril pierced in the nasal, which is divided by two sutures from nostril, the posterior part small, being merely the rim of the nostril, the anterior part smaller than postnasal; the nostril is posterior to suture of first labial with rostral; postnasal distinct, touching two labials; two loreals, both very low, the anterior loreal not higher than greatest height of second; latter longer than high, truncate posteriorly, separated from the subocular labial by two presubocular scales, the anterior much larger than posterior; seven or eight superciliaries; four supraoculars normally, three touching the frontal; five small postsuboculars, upper posterior enlarged, the

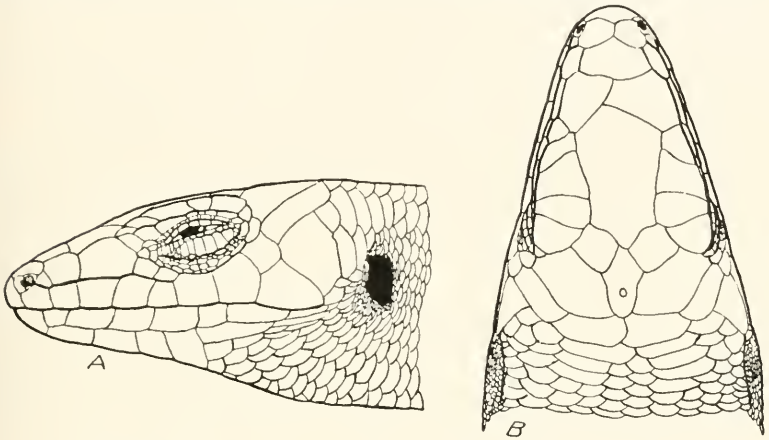


FIG. 16. *Eumeces longirostris* (Cope). K.U. No. 7280; Castle Island, Bermuda Islands. A, lateral view of head; B, dorsal view of head. Actual head length, 14 mm.; width, 12 mm.

others scarcely differentiated from small scales of lower eyelid; ten upper palpebral scales, normally separated from the superciliaries by a row of small granules; lower eyelid with a series of enlarged, vertically elongate scales, separated from the subocular by five rows of small granular scales; two very small postoculars.

Eight upper labials, the fifth smallest, the eighth largest, or seventh and eighth of nearly equal size and height; the primary temporal quadrangular, wedged between and forming equal sutures with the seventh and eighth labials, separated from the parietal by the last postsubocular; two large secondary temporals, the upper elongate, slender, nearly three times as long as wide, in contact with the parietal its entire length; lower secondary temporal very large, much larger than eighth labial, its lower posterior side slightly rounded; this is followed by a narrow, elongated tertiary temporal; eighth labial separated from ear by three or four postlabial scales

covering a distance equal to the entire length of eighth labial; temporals separated from ear by one or two scales; ear opening large, vertically oval, twice as high as wide.

Mental large, having a much wider labial border than the rostral; postmental single, very large; three pairs of chinshields, the first pair in contact, two following pairs separated; third pair followed by an elongate postgenial and a smaller, similarly shaped scale, longer than wide.

Dorsal scales larger than laterals, and usually smaller than ventrals; scale rows on sides of body and tail diagonal; the median ventral series of the tail somewhat widened (about 1.2 to 2.9 mm.), 109 scales in the subcaudal series. The number of scales in a row from parietal to above anus, 63 to 67; scales about auricular opening 26 to 31; two or three minute lobules on auricular margin.

Thirty scales about insertion of leg; about 24 around insertion of arm; outer wrist tubercle rounded, padlike, separated from typical arm scales by three rows of granules. Ten or eleven large, rounded, padlike scales on palm surrounded by smaller granular scales, and a few interpolated among the group; the lamellae under proximal two thirds of toes flattened pads, not imbricating; one or two series of intercalated scales on basal half (or two thirds) of fingers on inner side, between the dorsal and ventral lamellae; none on outer side. On the toes, this same condition exists, the two intercalated series reaching to or almost to the last distal joint.

Claws short, thick, the terminal lamellae not bound tightly about claws; heel scales large, contiguous, juxtaposed, none of the larger or smaller scales on the sole imbricating. In the axilla there is a group of small, nonimbricating, pavementlike scales, and a similar but somewhat less extensive group back of the insertion of the hind leg; lamellar formula for fingers: 8; 11; 15; 17; 11; for toes: 9; 13; 18; 24; 14.

Ten scales border anterior edge of vent, the three outer on each side very small; the fourth enlarged somewhat, and overlapping the very strongly enlarged median scales, and likewise overlapping the adjoining smaller scale, differing thus from other known species; three scales in the lateral postanal region of males differentiated; these are somewhat rounded on the surface and shaped differently from the surrounding scales. The pitting on the scales is extensive, occurring along the sides of neck and body and for some distance on the tail; these are also prominent in posthumeral and postfemoral regions; a few dorsal scales likewise have dim evidence of

pits. There are usually six pits, frequently more; they are elongated, extending along the posterior edge of the scale for a short distance.

Body moderately stout, with a relatively short axilla to groin measurement, the distance from the snout to forearm contained in the axilla to groin distance 1.3 times; limbs strongly developed, the adpressed hind limb reaching elbow of adpressed foreleg or just failing to reach the axilla; the foreleg about two thirds the distance from axilla to groin, reaching forward to beyond eye; the width of body contained in head and body length little more than five times; tail heavy, thick at base; head slender, somewhat longer than wide, the snout somewhat elongated but not conspicuously so. Diameter of eye contained 1.35 times in the distance from tip of snout.

Color and markings (from K.U. No. 8215, Bermuda). General ground color of dorsal region grayish olive, practically uniform on four median rows anteriorly, and six median rows posteriorly; dorsolateral line light greenish to creamy white. It originates on the edge of first supraocular, continues back to base of tail, covering 2 half scale rows; it is bordered above by a deep brown line equal to one scale row in width anteriorly, narrowing posteriorly; rostral region light, with two light areas extending back along prefrontals and onto sides of frontal; labials with a few scattered, creamy, irregularly placed whitish spots, more or less linear in arrangement, the line passing through ear and continuing as a broken series of spots to above forelimb, becoming continuous here and continuing to groin; between the light lines the color is deep chocolate brown for a width of about four to four and a half scales; ventral to lower light line and bordering it is a narrow, dark chocolate-brown stripe; chin and lower labials light, belly bluish gray; the lateral brown stripe continues some distance on tail.

Variation. This form, like most of the other species, shows considerable variation in the evolution of the color pattern due to age. The scale relationships appear rather constant. Some 40 specimens examined show the postnasal present in all save one (A.M.N.H. No. 27180), and only a single specimen (A.M.N.H. No. 27172) has two postmentals. The number of labials varies between seven and eight. The latter number is due to the breaking of the third or fourth labials into two parts. Thus either four or five labials precede the subocular labial. In forty specimens, 25 have five preceding the subocular (eight upper labials) and 14 have four preceding the subocular (seven labials) and one specimen four on one side, five

Table of Measurements of *Eumeces longirostris* (Cope)

Museum	U.S.N.M.	U.S.N.M.	U.S.N.M.	U.S.N.M.	U.S.N.M.	U.S.N.M.	K.U.	Mich.	Mich.
Number	4737	4737	4737	4737	4737	4737	8216	53030	53027
Sex							♂	♀	♂
Total length	122*	.....	.....	.....	179*	147*	148*	.....	.....
Tail	175	.....	.....	.....	111	76	69	.....	.....
Snout to vent	47	53	56	61	68	71	79	68	74
Snout to foreleg	17	23	23	23	27	29	30	24	27
Snout to ear	.....	.....	.....	.....	.....	.....	19	.....	.....
Length of head	9	9.6	10.6	.....	10	.....	16.5	13	16
Width of head	7	8	9	9	8	11	14.5	12	13
Width of body	.....	.....	.....	.....	.....	.....	20	.....	.....
Postanal tail width	4	5	6	8	7	8	10	8	10
Foreleg	14	15	15	19	20	22	25	21	22
Hind leg	21	24	25	31	29	33	36	31	35
Longest toe	10	11	11	14	13	15	12	10.5	13
Axilla to groin	.....	.....	.....	.....	.....	.....	40	35	39

* Regenerated.

on the other. The number of superciliaries varies: the number 5 appears five times; 6, sixteen times; 7, fourteen times, while 8 only three times. In two cases the number differed on sides of same animal: 8-7; 7-8. A single specimen showed variation in the supraoculars. The subdigital lamellae under the longest toe varies from 19 to 25 as follows. The number 19 appears once; 20, two times; 21, eleven times; 22, sixteen times; 23, five times; 24, one time, and 25, once.

The character of the temporals varies somewhat from that given in the description, but the condition described may be regarded as typical; the upper secondary temporal is frequently segmented, forming two upper temporals, the posterior part the larger; the tertiary temporal may likewise be divided. Occasionally the second pair of transversely widened nuchals is absent on one or both sides. The relationships of the frontonasal to the loreal, and the union of the prefrontals, appear to be constant.

The coloration given is that of a young male, probably adult, since the testes are large. In younger specimens the markings are generally on the same plan. There are markings on the rostral and on the canthus rostralis that are analogous to the anterior part of the two lines formed by the bifurcation of the median line in other species. The tail is bluish or purplish black.

In an older female (K.U. No. 8211), the dorsal coloration is grayish-olive, and the dorsolateral light lines are still more or less in evidence bordering the brown lateral stripe; but practically no trace remains of the narrow brown stripe bordering the dorsolateral light stripe above, save a few brownish flecks. The lateral brown band is of a very light brown color, broken up by diagonal series of light greenish dots forming diagonal rows; these are distinct, low on the sides, and may reach as far as the dorsolateral light line; the lower lateral light line is almost obsolete; the chin and preanal plates creamy-white.

In a large male (K.U. 8216) the entire dorsal and lateral surface is dark brown with a very large part of the scales showing greenish flecks. On the sides the lateral brown band shows fewest flecks. Lower on sides the greenish flecks are arranged in diagonal rows directed backward; the head is greenish to yellowish-olive above, heavily flecked with brown in the occipital region, less so anteriorly; on the sides of the head a light yellowish color predominates, with a darker area behind and below the eye. The labials are flecked with dull reddish-yellow; the chin and anterior

part of the throat are immaculate yellow; belly bluish or greenish-blue.

In (M.C.Z. No. 6911) embryos in eggs about ready for hatching, the white dorsolateral lines are seen beginning on the first or second supraoculars; a pair of elongate light spots on the snout simulate the termination of a pair of head lines. These spots extend from rostral along the anterior part of the sides of the frontal; the lateral lines are represented by a series of spots on the neck. The embryos are 29 to 30 millimeters long.

Remarks. The presence of this species on the Bermuda Islands is distinctly puzzling. There are no near relatives, and it appears to be an archaic form that has existed since Bermuda was connected with a former land mass; or that reached Bermuda from some land that is no longer existent; or that came from a body of land still existent but from which its ancestors have disappeared.

Unfortunately, other reptilian contemporaries have not survived on Bermuda. These, did they still exist, might offer a clue as to which of these possibilities was most likely. However, it appears that the true history of the colonization of the land, now Bermuda, is lost forever in oblivion.

Distribution. The species occurs only on the Bermuda Islands.

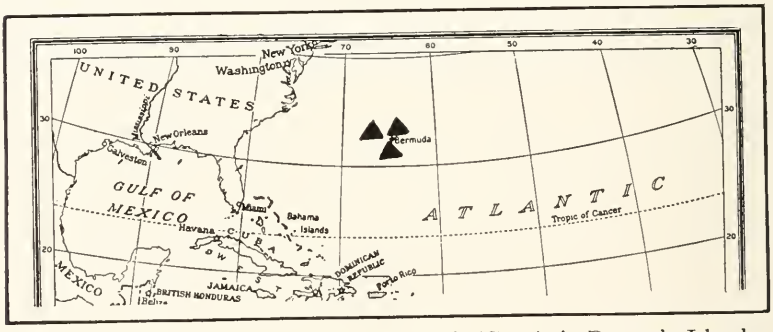


FIG. 17. Distribution of *Eumeces longirostris* (Cope), in Bermuda Islands.

Locality records:

BERMUDA ISLANDS: (M.C.Z. 54) (A.M.N.H. 37) (U.S.N.M. 6) (Field Mus. 25) (A.N.S.P. 2); Castle Island (M.C.Z. 30) (K.U. 4) (Mich. 6); Ducking Stool (A.N.S.P. 2).

LYNXE GROUP

This group, comprising two closely related Mexican forms, is characterized as follows: A short median light line runs forward bifurcating on the medial or anterior part of the frontal; and these resulting lines reunite on the frontal. They are in contact anteriorly

with the dorsolateral light lines which follow the third and fourth scale rows. A broad lateral brown stripe present; a lateral light line to groin, bordered below by a darker line; indistinct dotted dark lines on dorsal scales. Tail bluish in young. Ovoviviparous. Limbs small, widely separated in adults when adpressed. Scale rows, 22 to 26. Supraoculars variable.

KEY TO THE FORMS

A. Four supraoculars ..... *Eumeces lynxe lynxe* (Wiegmann), 163
AA. Three supraoculars ..... *Eumeces lynxe furcirostris* (Cope), 173

FIG. 18. Distribution of members of the Lynxe group, in Mexico.

Eumeces lynxe lynxe (Wiegmann)

(Plate 41, Fig. B; Figs. 18, 19)

SYNONYMY

1828. *Scincus quinquelineatus* var. Wiegmann. Isis, 1828, p. 373.
1834. *Euprepes lynxe* Wiegmann. Herpet. Mexicana, 1934, pp. 36-37 (type description; type locality, "*Specimena nostra prope* Chico *invenit* Depp"); Arch. für Naturg., Jahr. 1, Band 2, 1835, p. 288; Garman, Bull. Essex Inst., XVI, 1884, p. 15 (under *Eumeces*).
1839. *Plestiodon quinquelineatum* Duméril and Bibron. Erp. Gén., V, 1839, pp. 707-708 (part.) (*Euprepes lynxe* made a synonym of *quinquelineatum* Linnaeus); Dugès, La Naturaleza, (1), I, 1870, p. 144; ? Gravenhorst, Nova Act. Acad. Leop.-Carol., XXIII, 1851, pp. 350-354 (part.).
1845. *Plestiodon Bellii* Gray. Cat. Liz. Brit. Mus., 1845, p. 92 (type locality unknown).
1864. *Eumeces lynxe* Peters. Monatsb. Acad. Wiss. Berlin, 1864, p. 484; Bocourt, Miss. Sci. Mexique, Livr. VI, 1879, pp. 437-439, pl. XXII E, figs. 9, 9a, 9b, 9c, 9d (description of specimens from Guanajuato, Mex.); Sumichrast, La Naturaleza, (1), VI, 1882-1884, pp. 31-45 (reports the species common up to 3,000 meters on Orizaba; perhaps this is *furcirostris*); Cope, Proc. Acad. Nat. Sci., Phila., XXII, 1885, p. 170 (key characters); Günther, Biol. Cent. Amer., Rept. Batr., 1885, p. 32; Boulenger,

Cat. Liz. Brit. Mus., III, 1887, p. 380 (part.) (specimen from Jalapa); Cope, Bull. U. S. Nat. Mus., No. 32, 1887, p. 46; Garman, Bull. Essex Inst., XIX, 1887, p. 129; Dugès, La Naturaleza, (2), I, 1889, p. 282 (Aztec name); Cope, Rept. U. S. Nat. Mus., 1898, (1900), p. 630 (key); Dugès, La Naturaleza, (2), II, 1900, p. 484 (Guanajuato); Gadow, Proc. Zoöl. Soc. London, 1905, pp. 218-219 (habits; also listed as *Eumeces lynce,* typ. error, p. 233).

?1865. *Plistodon lynxe* Cope. Proc. Acad. Nat. Sci. Phila., 1865, pp. 185-198 (this specimen, "Tableland and Southern mountains of Mexico, Doctor Sartorius Coll.," is referred by Cope [1887] to *E. brevirostris;* a specimen of *E. copei* in the National Museum, No. 7037, with only "Mexico" as a locality label, may be the specimen referred to).

1887. *Eumeces bellii* Boulenger. Cat. Liz. Brit. Mus., III, 1887, pp. 378-379.

1931. *Eumeces lynxae* Hartweg. Copeia, No. 2, 1931, p. 61 (ovoviviparity).

History. The first specimen of *Eumeces lynxe* reached Europe in a collection made by Ferdinand Deppe in Mexico. The specimen was mentioned by Dr. A. F. Wiegmann (Isis, 1828, p. 373) under the designation *Scincus quinquelineatus* var. Schneid. as follows:

"Aus der Familie der Scincoiden erhielten mir die von Schneider (Hist. Amphib., II, p. 201) beschriebene Varietät des *Scincus quinquelineatus* mit dem blauen Schwanze welche von den Einwohnern Lynxe genannt und wegen ihres vermeintlichen giftes sehr gefürchtet. Auch Hernandez* erwähnt ihrer bereits unter dem namen Tetzauhcoatl."

In 1834 Wiegmann, while dealing with the entire known Mexican herpetological fauna, described this specimen under the name of *E* [*uprepis*] *lynxe,* failing to associate the form with *Eumeces,* the newly created genus of his own making in this same work.

Peters (1864) appears to have been the first to place the form in its correct genus. Cope (1865) used the generic name *Plistodon;* Bocourt (1879) refers the species again to the genus *Eumeces;* and most authors have subsequently referred the species to this genus.

The form of the specific name of the species has been changed by Hartweg (1931) from *lynxe* to *lynxae,* which seems to be incorrect. The name is presumably (*vide* Wiegmann [1828]) the Latin equivalent of native Mexican for the large wild cats; and the scientific name based on the classic Latin word *lynx,* if placed in the genitive, would be *lyncis.* This change is not necessary.

Gray (1845) described *Plestiodon Bellii* from a specimen from an unknown locality. Boulenger (1887) maintained it as a separate species, apparently on the basis of its having a large first supraocular touching the frontal, and having the sixth and seventh labials of equal size. H. W. Parker, of the British Museum, has recently had the great kindness to examine the type to see if aught could be determined regarding its origin, and to compare it with *Eumeces lynxe.* He writes:

* "Nova Plantarum Animalium et Mineralium Mexicanorum Historia. Tractatus tertius," by Francisco Hernandez. (Rome, 1651.) Under the Aztec name, tetzauhcoatl.

"Nothing whatever is known of the locality of the specimen; it was formerly in Thomas Bell's collection and most of the specimens went to Oxford; I have written to see if there is any list or catalogue in existence. I am afraid that, having no knowledge of the genus whatever, I am not competent to express any views as to its status, but it appears to me to be very close to *E. lynxe* in most characters except that the first supraocular is decidedly larger and in contact with the frontal."

Mr. Parker has furnished a photograph of the type to me for study.

An examination of the excellent photographs causes me to concur with Mr. Parker's opinion. In the material available to me of this species I find that the first supraocular is variable as regards its relation to the frontal. Specimens having the two scales in contact, and others having them separated, appear in the same brood. Likewise, this same variation obtains in specimens from identical localities. Some of these show variation in the length of the suture. In certain ones it is considerable; in others the scales are in contact at a single point. The size of the sixth labial varies somewhat so that occasionally it approaches the seventh in size. Unless it is possible to show that a considerable population exists in which these characters are fairly stable, it seems best to consider *bellii* a synonym of *E. lynxe*.

Boulenger has placed *Eumeces furcirostris* as a synonym of *lynxe*, probably presuming it to be merely an abnormal specimen. The type has a divided frontal, and only three supraoculars, and these characters were used by Cope to separate it from *lynxe*. The character of the reduced number of supraocular plates, appearing as it does in the southern part of the range, seems to warrant the retention of Cope's species as a subspecies of *lynxe*. I believe the division of the frontal to be an abnormality, since I have found this condition on several occasions in other species of the genus: viz. *laticeps*, *fasciatus*, and *skiltonianus*, and it does not occur in a second specimen of *furcirostris* examined.

Gadow (1905, pp. 128, 195) mentions *Eumeces fuscirostris* (*sic*). It would appear that he really meant *brevirostris*, since he later omits *fuscirostris* and records *brevirostris* from the same locality and elevation.

The type locality of Wiegmann's species is "prope Chico." This place name probably refers to a locality of this name either in Vera Cruz or Pueblo; both are near the old Camino Real between Mexico City and Vera Cruz.

Diagnosis. A medium-sized species with limbs touching in young, widely separated in adults when adpressed. A median light line, extending to the shoulders or somewhat beyond, bifurcates on the frontal, the parts joining again on the rostral; the dorsolateral light lines distinct, usually retained in adults (but may be lost in old males), beginning on rostral, and extending to base of tail, usually lessening in distinctness posteriorly; a lateral light line begins on rostral and continues to groin; one postmental; no postnasal; anterior superciliary may or may not touch the prefrontal; first supraocular either in contact or not, with the frontal; four supraoculars.

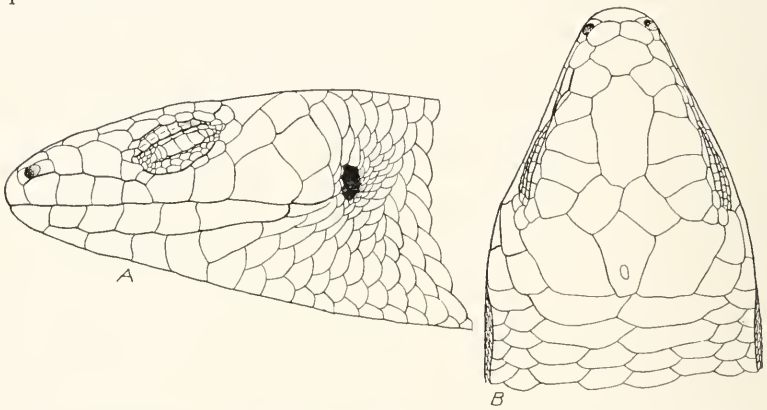


FIG. 19. *Eumeces lynxe lynxe* (Wiegmann). A.M.N.H. No. 12835; Hidalgo, Mexico. A, lateral view of head; B, dorsal view of head. Actual head length, 9.3 mm.; width, 8 mm.

Description of species. Rostral moderate, the portion visible above normal; supranasals large, widely separating the frontonasal from the rostral; frontonasal much broader than long, touching anterior loreal laterally and usually forming a suture with the frontal (sometimes not); prefrontals rather small, usually separated, touching both loreals laterally and very broadly in contact with the first supraocular; frontal not noticeably elongated, but distinctly longer than its distance from the end of the snout, somewhat narrowed at a point not far from the posterior end, after which it widens slightly, touching three supraoculars laterally (sometimes only two, in which case the most anterior is excluded); frontoparietals more or less rectangular, forming a moderate median suture; interparietal about a third longer than wide, not inclosed by the parietals; two pairs of nuchals, the anterior of same transverse length but distinctly wider than posterior.

Nasal diagonally placed, rectangular, twice as long as high; the nostril directed down and forward, posterior to the suture of the first labial with the rostral; no postnasal; two loreals, the anterior higher, touching two anterior labials; posterior loreal about as long as high, touching the second and third labials, but widely separated from the fourth; two presuboculars; six superciliaries (rarely five or seven), first relatively small, scarcely of greater bulk than second, usually excluded from contact with the prefrontal; four supraoculars, the anterior variable in size and in its relation to the frontal; three postsuboculars; seven upper labials, the last usually largest, separated from auricular opening by a curved, elongate postlabial; this separated from ear by two minute scutes; subocular (fifth labial) somewhat longer than high, somewhat higher posteriorly; first labial largest of the first four, not abruptly elevated posteriorly; the fourth smallest; four temporals, the primary about as large as those of the second series, forming a moderate suture with the lower, excluding the seventh labial from the upper secondary; the tertiary is narrow, elongated, curved, entering the auricular border; labial border of mental more extensive than that of rostral; a single postmental; three typical, paired chinshields, followed by an elongate postgenial shield, bordered on its inner anterior edge by a scale wider than long; six lower labials; eye length equal to the distance from nostril; palpebral scales in contact with the superciliaries save for one or two small intercalated scales at anterior and posterior corners; a small preocular and two small postoculars; three or four enlarged opaque scales on the lower eyelid separated from the subocular labial by two rows of granular scales.

Ear opening small, rounded, surrounded by about 16 scales; usually a single, rounded, preauricular lobule, or one large and one small one; scales of the two median dorsal series transversely elongated anteriorly, all with curving posterior edges, not, or only slightly, larger than adjoining rows; scales on sides of body and narrow part of neck parallel; scales on sides behind arm not strongly diagonal; scale rows around neck immediately behind ear, 28; around narrow part of neck, 25; behind arm, 29; about middle of body, 24; about base of tail, 15 to 17; from occiput to above anus, 60 to 63; scales on sides and abdomen not or only slightly smaller than the dorsal series; nine or ten scales about arm insertion; fourteen about insertion of leg; eight preanal scales, the two median much enlarged, those adjoining laterally decreasing in size, the outer ones smaller but overlapping the inner; the scales under the tail

distinctly widened; tail only a little longer than head and body; limbs small, widely separated when adpressed; lamellar formula of fingers: 5; 8; 11; 10; 8; of toes: 5; 9; 11; 12; 8. A series of five enlarged scutes border the heel; three or four enlarged tubercles on posterior part of the sole.

Color. Above generally brownish olive with (usually) a series of six very narrow lines of small blackish dots; somewhat posterior to the shoulders a median light line bordered with brown begins and continues forward, growing more distinct; on the anterior or medial part of the frontal it bifurcates and the branches pass to the prefrontals, where they unite with the dorsolateral light lines and continue to rostral; the dorsolateral light (whitish or cream) line passes back along the side, on the edges of the third and fourth scale rows; a broad brown lateral stripe from in front of eye to tail, slightly wider on neck, where it involves the upper edge of ear, but continues as a stripe of uniform width the length of the body, covering the whole of the sixth scale row and half of the two scale rows adjoining; this stripe bordered above by the dorsolateral light line, and below by a lateral light line; latter begins on rostral and continues to groin, where it stops or is indistinctly continued on the front of femur; the lateral line is bordered below by a very narrow indistinct darker line, below which the color merges into the dull bluish-gray of the abdomen; chin and lower labials cream; a cream or whitish area on breast; tail an indefinite bluish-gray; the dark color of the back continues some distance on tail, behind which indistinct flecks can be observed. Each scale on side of tail has a darker area; anal scales and the median ventral subcaudals of lighter color, usually of a shade of lavender; head slightly more brownish than back, irregularly flecked with darker.

Variation. Seventy-eight specimens of this species have been available for study, representing localities from a considerable part of its known range. By far the largest number of these specimens are in the Museum of Comparative Zoölogy at Harvard, collected in Guerrero and San Miguel, Hidalgo, by W. M. Mann; and in the Alvarez Mountains, San Luis Potosi, by Edw. Palmer and W. W. Brown.

The number of scale rows about the body and neck varies as follows: Behind ear, 27 to 32; about more constricted portion of neck, 23 to 26, with 25 occurring twice as frequently as any other number (one specimen has 29 rows); about middle of body, 22 to 26, with 26 occurring once, 25, three times, 24, 71 times, 23, once,

Measurements of *Eumeces lynxe lynxe* (Wiegmann)

Museum Number* Sex	M.C.Z. 11427 yg.	M.C.Z. 11428 yg.	M.C.Z. 19080 yg.	M.C.Z. 19084 yg.	M.C.Z. 11321	M.C.Z. 11333 ♀	M.C.Z. 11319 ♀	M.C.Z. 4540B ♀	M.C.Z. 56503 ♂	M.C.Z. 48067 ♀	M.C.Z. 19081 ♂	M.C.Z. 19083 ♂	M.C.Z. 19082 ♀
Snout to vent	26	35	41	48	51	54	58	60	62	64	66	68	70
Tail	30	.....	.....	.....	72	76	.....	.....	.....	70	.....	.....	.....
Snout to foreleg	8.8	12	13	15	15.2	16	16.3	17	17.6	19	19	22	19
Snout to ear	.....	.....	.....	.....	.....	.....	.....	.....	9.5	10.2	10.6	11.2	12.2
Snout to eye	.....	.....	.....	.....	.....	.....	.....	.....	3.9	4.2	4.4	4.8	5
Axilla to groin	13	18	22	26	28	34	35	35	35	38	38	38	44†
Width of head	4.4	5	5.2	6.5	7.6	7.2	8	8	9	8	10	9	9
Length of head	5.3	5.5	6.7	7	8.7	9	8.8	8.7	8.9	9.2	10.5	10.5	9.5
Postnasal width	2	2	.....	5	5.7	5.7	6	7	7	6.5	7	8	8
Foreleg	6.5	8	8.7	10	11	11	12	11	12	12	13.6	13	12
Hind leg	8	9.3	12	14.3	15.2	16	16	17	15	17	18.3	18	17
Longest toe	3.4	4	4.2	5	6.1	6.2	6	6	.....	.....	6.5	6.2	6

* Nos. 11427, 11428 are from San Miguel, Hidalgo; 11319, 11321, 11333, 56503, 48067, Guerrero, Hidalgo; 19080, 19081, 19082, 19083, 19084, 4540B, Alvarez Mts., San Luis Potosi. Practically all the specimens examined have the tails regenerated.

† Distended with young.

and 22, twice. The upper labials are seven, save in one specimen with six on each side, and one with a formula of seven-eight. The seventh (or last) of the series is invariably the largest, but the sixth often approaches it in size. Two pairs of nuchals are especially constant; only one exception, this having a single pair, was noted. The single postmental is invariably present, and the postnasal invariably absent. The superciliaries are usually six, the numbers five or seven rarely occurring. The relation of the frontonasal to the frontal is quite variable. They touch in 46 specimens, and are separated in 32. The exclusion of the first supraocular from the frontal occurs in 13 specimens; in three of these, it was true on one side only. This variation occurs more frequently in specimens from Guerrero, Hidalgo, but it is not constant. The number of lamellae under the fourth toe varies from eleven to fourteen, in the following order of frequency: 14, 13, 11, 12, the last number being three times as frequent as any of the others. A single specimen has 15-16 lamellae. The number of scales from occiput to above anus usually 60 to 63, occurring in the following order of frequency: 60, 63, 61, 62, the latter two numbers slightly more numerous than the former two. One specimen has 65, while seven have only 59. The parietal is never inclosed. The first superciliary varies greatly in its relationship with the prefrontal, being in contact in about 47 percent of the cases and separated in 53 percent. The frontonasal is invariably in contact with the loreals. The number of presuboculars was constantly two; the usual number of postsuboculars is 3-3, with 3-4, and 4-4 occurring rarely. The character of the temporals is remarkably constant. The primary is always large and invariably touching the lower secondary. Usually there is a single anterior postlabial followed by a pair of small scales.

The ground color varies in the adult from a bronze to chocolate, or olive-brown. Usually dark areas, on the scales of the six dorsal rows, form indistinct dotted longitudinal lines; the two median, where they border the median light line anteriorly, may join and form continuous lines. The dorsolateral light lines vary from greenish-white to yellow-cream. In old specimens they may be grayish or even tan, and usually less distinct posteriorly, but rarely becoming completely lost posteriorly. The dorsolateral line occupies the outer half of the third scale row and a small adjoining part of the fourth row; the brown lateral stripe is always separated from its fellow by six complete scale rows and the edges of the adjoining rows.

In two specimens, 19083 and 19087, M.C.Z., practically all trace of the median line is wanting, as well as the bifurcating lines on the head. No. 19087 is light brown, the scales not showing the dotted black lines. The head is colored like the body; the lateral stripe is dark chocolate brown and very distinct, but the light stripes normally bordering it are scarcely discernible. No. 19083 is olive in color, the dotted lines dimly visible on the back. Other large specimens from the same locality have the light lines more or less distinct.

The tails are usually grayish or bluish or bluish-gray. The brown stripe is continued a greater or less distance on its sides. The under side of the tail, in preserved specimens, is very often lavender in color (possibly pinkish in life). In the young the light stripes are more distinct anteriorly. Only rarely can the median line be traced back past the middle of the body, and it appears never to be very distinct past the shoulders.

The head is dark brown to blackish. The forking lines which begin on the frontal and join the dorsolaterals on the prefrontals may sometimes be very indistinct even in very young specimens (26 mm). Usually, though, they are very distinct, the separation beginning about midway on the frontal.

The upper part of the ear is not involved in the lateral light line. In older specimens, the forking line is the first part of the median line to disappear, but occasionally it is retained in fully adult specimens (50 to 60 mm.).

The minimum size of the young when born is 26 to 27 millimeters; the largest specimens seen, a male and female, measure 70 millimeters. In the very young the limbs when adpressed touch or overlap one or two millimeters. In old adults they are separated by as much as 15 millimeters.

Remarks. Hartweg (1931) has reported on presumed ovoviviparity in the species. In the material examined I found developing embryos in M.C.Z. numbers 19082, 11318, 11324, 11325, 11328, 11323, and 11331. Ovoviviparity would appear to be the normal method of reproduction in this species.

An attempt to locate definitely the type locality Chico has not been successful. There are villages of this name in Jalisco, near Mascota, in the district of Tepexi, Puebla, near Irapuato, Guanajuato, and villages named El Chico near Jalapa, Vera Cruz, near Autlan, Jalisco, and near Coahuayana, Michoacán. One would presume that the one in Puebla, not far from the Mexico City - Vera

Cruz highway, or that in Vera Cruz, might be the locality mentioned by Wiegmann.

The native Mexican name in Guanajuato is Agujilla. I collected about Santa Rosa where Dugès obtained specimens, but neither here or elsewhere in Mexico did Hobart Smith or I find specimens of the species. The small skinks are regarded as deadly by the people near Santa Rosa, while many other lizards were said to be harmless.

The relationship of this subspecies is nearest to *lynxe furcirostris;* both are apparently aberrant members of, or related to, the *Brevilineatus* group, differing in certain characters of markings and squamation, and differing especially in their mode of reproduction.

Distribution. Eumeces lynxe, a high mountain or plateau form, occupies a considerable portion of the southern plateau region. It probably does not reach the western and southern limits of the plateau on the Pacific side. However, there are certain questionable records of the species in southern Jalisco, or Colima, and in Guerrero.

These two records, "Nevado de Colima," and "Omilteme, Sierra Madre, west of Chilpancingo, Guerrero" of Gadow (1905), may be questioned, on the presumption that the material was identified incorrectly. It is possible that the "Nevado de Colima" specimens are now represented in the British Musuem collection by a specimen identified as *brevirostris,* labeled "Nevada Camp" Gadow. I can find no trace of the Omilteme specimen.

The British Museum has two specimens identified as *lynxe* from "Tauvitavo, Michoacán, 8,000 feet." Neither the "Directorio General de Correos y Telegrafos," nor any recent map I have consulted, gives Tauvitavo as a place name of settlement or mountain. It is possible that it is a misspelling (or misreading of a label) for Tarecuato, Tarejero, Taretaro, Tarietaro, or Tarimoro, all place names in Michoacán. The eastern part of Michoacán is within the presumed range of the species. The species is definitely known from the states of Guanajuato, Hidalgo, and San Luis Potosí. The records for Vera Cruz probably refer (at least for the most part) to *Eumeces lynxe furcirostris* (Cope).

Locality records:

VERA CRUZ: Alpine Region of Orizaba to 3,000 meters (Sumichrast 1882); Jalapa (several specimens. Boulenger [1887]. Possibly certain of these should be referred to *E. lynxe furcirostris*).

SAN LUIS POTOSÍ: Alvarez Mountains (M.C.Z. 11); Alvarez (M.C.Z. 28).

MICHOACAN: "Tauvitavo," 8,000 feet (British Mus.) (Doubtful).

GUERRERO: "Omilteme," Sierra Madre west of Chilpancingo, 8,000 feet (Gadow, 1905) (Doubtful).

HIDALGO: Zacualtipan (A.N.S.P. 1); San Miguel (M.C.Z. 6); 'Valosea' ? (M.C.Z. 1); Guerrero (M.C.Z. 21) (A.M.N.H. 4) (Mich. 4 with 6 embryos); "Hidalgo" (A. Dugès Mus. 1).

PUEBLA: Zacatlan (A.M.N.H. 1).

GUANAJUATO: Santa Rosa (A. Dugès Mus. 2); "Guanajuato" (Bocourt, 1879).

Indeterminate records: Mexico (U.S.N.M. 1) (identified as *E. Bellii*); near Chico (type locality; 1, Wiegmann).

Eumeces lynxe furcirostris (Cope)

(Figs. 18, 20)

SYNONYMY

1885. *Eumeces furcirostris* Cope. Proc. Amer. Phil. Soc., XXII, Jan. to Oct., 1885, pp. 169-170 (printed Mar. 7, 1885) (type description; type locality not stated); *idem*, p. 380 (Jalapa named as the type locality); Günther, Biol. Cent. Amer., Rept. Batr., Oct., 1885, p. 33; Ferrari-Perez, Proc. U. S. Nat. Mus., IX, 1886, p. 196 (state of Puebla; Teziutlan); Cope, Bull. U. S. Nat. Mus. No. 32, 1887, p. 169; and Rep. U. S. Nat. Mus., 1898 (1900), p. 630 (Key).

1887. *Eumeces lynxe* Boulenger. Cat. Liz. Brit. Mus., III, 1887, p. 380 (part.).

History. The type specimen was collected at Jalapa, Vera Cruz, by Doctor Flohr, and originally formed a part of the collection of the Comisión Geographica, part of which was later obtained by the Academy of Natural Sciences of Philadelphia. The specimen, abnormal in the character of the divided frontal, was described by Cope (1885), who at the same time published in the description a key to the known Mexican species of the genus. The type is now No. 11327 in the collection of the Academy of Natural Sciences of Philadelphia.

Two years later Boulenger (1887) placed *furcirostris* in the synonymy of *Eumeces lynxe* (Wiegmann). In the description given for *lynxe* he notes "four supraoculars, second and third in contact with the frontal, first very small, sometimes united with the first supraciliary;" evidencing the presence of this form in the Hoege series of specimens in the British Museum. It seems that since in the northern part of the range the number of supraoculars in *lynxe* is fixed at four while in the southeastern part of the range the number is three, it is well to recognize the latter population as representing a subspecies rather than a species, since there is evidence that the characters overlap, in a part of the range, as suggested by the British Museum series.

Diagnosis. Similar to *Eumeces lynxe lynxe* in having a dorsolateral and lateral light line, with a short median line from the shoulders bifurcating on the frontal and joining the dorsolateral lines near the tip of the snout; general character of scales similar to *lynxe lynxe* save that there are three supraoculars, two touching

the frontal, and the first superciliary is larger and invariably in contact with the prefrontal.

Description of subspecies. (From type specimen, No. 11327, A.N.S.P. collection; collected by Doctor Flohr, Jalapa, Vera Cruz, Mexico.) Similar in general contour and markings to *Eumeces lynxe lynxe.* The part of rostral visible from above distinctly less than the frontonasal; supranasals moderately large, in contact mesially, larger than nasals; frontonasal very broad, broadly in contact with the anterior loreal; prefrontals large, fused (abnormally) to form a single scale, and forming sutures with the fronto-

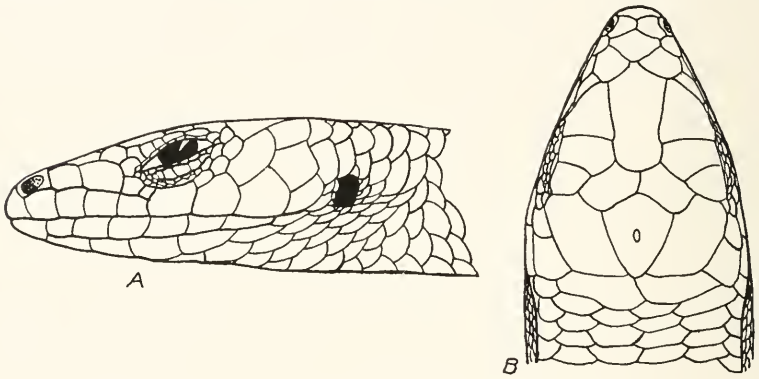


FIG. 20. *Eumeces lynxe furcirostris* (Cope). E.H.T. and H.M.S. No. 2517, young; Toxtlacuaya, Vera Cruz, Mexico. A, laterial view of head; B, dorsal view of head. Actual head length, 5.3 mm.; width, 4.2 mm.

nasal, frontal, posterior loreal, first superciliary, anterior loreal, and the first supraocular, the length of sutures in order named; frontal segmented transversely (abnormally), forming an obtuse angle anteriorly, somewhat rounded posteriorly, touching two supraoculars; frontoparietals diagonally placed, longer than broad, forming a strong median suture; interparietal broad, short, not inclosed by the parietals; parietals rather narrow, elongate; first nuchals very large, their longitudinal width more than one and one half times that of the second pair (the right member of second pair divided, leaving a median scale).

Nasal low, elongate, divided by sutures, the anterior portion larger than posterior; nostril directed strongly down and forward; two loreals, the anterior only slightly higher than posterior; latter largest, broadly in contact with two labials, and forming equal sutures with the first superciliary and the prefrontal; two presuboculars, the posterior deeply wedged between the fourth and fifth

upper labials; three postsuboculars; three supraoculars, the anterior very large, triangular; five-six superciliaries, the anterior very large, the posterior vertical scale relatively very small; primary temporal very large, not or but slightly smaller than the upper secondary, and somewhat smaller than the lower secondary, with which it forms a broad suture; tertiary temporal narrow, elongate, separated from the ear by a very minute scale; seven upper labials, four preceding the subocular, of which the first is highest and largest, the fourth very greatly reduced; seventh labial largest; postlabial, on the left, one very large diagonally-placed scale, separated from the ear by two minute scales; on right side, the scale is much smaller than on the left and the two following are much larger; two small, very inconspicuous preauricular lobules; six lower labials; upper median palpebral scales not separated from the superciliaries by granules; two (three) enlarged scales on lower eyelid, separated from the subocular by two rows of granules. Mental with labial border greater than that of rostral; a single azygous postmental; three pairs of nearly equal-sized chinshields; postgenial relatively small, bordered on its inner anterior border by a scale much broader than long; fourteen scales about auricular opening, which is relatively small.

Scales on body generally parallel, those on the dorsal surface somewhat larger than the lateral or ventral series; those of the two median rows slightly larger than adjoining series, and distinctly widened transversely in nuchal region; scales in 30 rows behind ear; around narrow part of neck, 26 rows; in axillary region, 29 rows; about middle of body, 24 rows; about base of tail, 17; sixty-two scales in a row from occiput to above vent; tail regenerated; six preanal scales, the two median strongly enlarged, the two outer small, subequal, the outer overlapping inner; subcaudals very distinctly broadened.

Limbs short, slender, separated by length of eight scales when adpressed; a prominent wrist tubercle; the palm with a group of enlarged scales; lamellar formula of fingers: 5; 8; 11; 9; 6. Heel bordered by four or five enlarged padlike scales, the sole with one or two slightly enlarged tubercles, but scales subequal and slightly imbricate; lamellar formula of toes: 5; 9; 12; 12; 8. The terminal lamellae not tightly bound about base of claws; eleven scales about insertion of arm; a small area of granular scales in axilla; fourteen scales about insertion of hind limb; no granular scales behind insertion; an enlarged scale in the lateral postanal region, undif-

ferentiated save for a lighter colored median area. Pits present on scales; in lateral nuchal region, one or two pits are dimly evident; in axillary region and posterior humeral region the pits are stronger, sometimes four or five pits being present on a single scale; one or two pits dimly evident on the lateral body scales, but on posterior femoral scales and on sides of the tail in the anal region the scales bear from three to eight pits.

Color. Above generally olive to olive-bronze, the head dark brown, with a short median line extending from the scapular region to the middle of the frontal, where it divides, each part running forward to rostral, inclosing a brown area; dorsolateral light lines extend from the first superciliary back along side of head and body to tail, where they become lost; each follows the middle of the third scale row and covers about half the scales; both the median and dorsolateral lines are edged anteriorly with deep brown, leaving anteriorly intercalated lines of ground color; these dark, bordering lines scarcely reach the middle of body on the dorsal region; a clearly defined brown lateral stripe begins on the loreals and runs to some distance on the tail, anteriorly involving eye and upper half of ear, and bordered above by the dorsolateral, and below by the lateral, light lines; lateral line begins on rostral, follows lower edge of upper labials through lower half of ear to insertion of hind limb; below this the color merges into the light greenish-gray color of the sides; rostral and lower surface of head and neck region light yellow-brown; under side of limbs and area about vent whitish; fingers and toes blotched or barred with silver-gray; under side of feet brownish; upper part of arm and leg dark brown, sharply delimited from the gray color of the posterior humeral and femoral regions of the limbs.

Variation. The young specimen (T—S. No. 2517) measured below has 22 scale rows, the frontonasal much broader than long, touching the frontal; latter undivided; the prefrontals separated, distinct; the dorsolateral light lines bluish to greenish-white, the median line bifurcating and joining the dorsolaterals, extending posteriorly to the middle of the body, gradually becoming fainter until it is lost; very dim grayish lines begin on the neck and border the edges of the first and second rows; dotted lines on the back scarcely discernible; head blackish; lateral line from third labial, involves lower half of ear, widens a little on the side of neck, and continues as a very narrow line along the side, on the upper edge of the sixth scale row, to sides of tail, interrupted at insertion of

Measurements of *Eumeces lynxe furcirostris* (Cope)

Museum Number Sex	Type A.N.S.P. 11327 ♂	T—S. 2517 yg.
Snout to vent	54	26
Tail	29 reg.	28
Snout to eye	3.4	2.4
Snout to ear	9.2	5.5
Snout to foreleg	12.2	19.8
Axilla to groin	32	14.8
Postanal width	5.3	1.5
Foreleg	11.5	7
Hind leg	16	8.6
Longest toe	6.5	3.6
Head length	8	5.3
Head width	7	4.2
Body width	9	3.5

hind limb; soles and palms dark; chin and breast cream; ventral surface bluish-gray; tail ultramarine; adpressed limbs overlap about one millimeter.

Remarks. The type specimen in the Philadelphia Academy of Natural Sciences is still in good condition. The extreme tip of the tail is regenerated, and the color is doubtless somewhat faded.

A very young specimen collected by Hobart Smith at Toxtlacuaya was found in pine forest at an elevation of about 8,000 feet. The specimen was routed from the bark of a fallen pine tree. The tail is a brilliant blue. This specimen is figured. It will be noted that the interparietal is proportionately larger in young than in adult specimens.

It may appear that this form has been retained as a distinct subspecies on relatively meager data. It is true that only a few specimens have reached museums. With the accumulation of more material of *lynxe* from Puebla and Vera Cruz, my conclusions as regards the distinctness of this subspecies must either be corroborated, or, failing to do so, must see the name returned to the oblivion of synonymy.

Distribution. This subspecies is found in southern Hidalgo, Puebla and Vera Cruz. It is probable that there is a part of this

region where the characters of the two subspecies overlap. (See Fig. 18 for distributional map.)

Locality records:

?HIDALGO: Zacualtipan (A.N.S.P. 1).
VERA CRUZ: Jalapa (Xalapa) (Brit. Mus. several) (A.N.S.P. 1, type); Toxtlacuaya, near Las Vigas, Vera Cruz (Taylor-Smith 1).
PUEBLA: Teziutlan (Ferrari-Perez 3).

SUMICHRASTI GROUP

To this group I assign the single species *Eumeces sumichrasti* (Cope), known from southern Mexico and northern Central America. It is characterized by rather large size and is typically five lined, save that the median light line bifurcates on the posterior part of the frontal instead of on the nuchal. Lines lost in the adult males. Two presuboculars; tails blue in young; eight upper labials; two pairs of nuchals; postgenial bordered by a scale longer than wide on its inner margin; scales in 28 to 30 rows, parallel on the sides; many lateral scales with numerous pits on posterior borders; subcaudals widened. Limbs large, broadly overlapping when adpressed; terminal lamellae not tightly bound about base of claws.

This group seems to be more or less closely related to the *Fasciatus* group, and agrees in most pertinent characters save in the character of the head lines.

Eumeces sumichrasti (Cope)

(Plate 12; Figs. 21, 22, 23)

SYNONYMY

1866. *Plistodon sumichrasti* Cope. Proc. Acad. Nat. Sci. Phila., 1866, p. 321 (type description; type locality erroneously stated to be "Orizava"; Sumichrast Coll.).
1879. *Eumeces sumichrasti* Bocourt. Miss. Sci. Mex., Rept., Liv. 6, 1879, p. 422; Cope, Proc. Amer. Philos. Soc., XXII, 1885, p. 170 (Key); Günther, Biol. Cent. Amer., Rept. Batr., 1885, p. 32; Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 371 (Jalapa, Hoege Coll.); Cope, Bull. U. S. Nat. Mus., No. 32, 1887, p. 46 (Orizaba, Vera Cruz; and Potrero, Tierra Caliente of Vera Cruz [Sumichrast]).
1884. *Eumeces* (*Plestiodon*) *sumichrasti* Sumichrast. La Naturaleza, VI, 1882-1884, p. 40.
?1895. *Eumeces rovirosae* Dugès. La Naturaleza, (2), II, 1895-'96 (1895), pp. 298-299, Lam. XIII (type description; type locality, Mineral de Santa Fé, Chiapas; Navarro Coll.); *idem*, 1896, p. 376; Boulenger, Zoöl. Record, 1893, pp. 1-38 (makes *rovirosae* a synonym of *lynxe*).
1932. *Eumeces schmidti* Dunn. Proc. Acad. Nat. Sci. Phila., LXXXIV, Mar. 22, 1932, pp. 30-31 (type description; type locality Lancetilla, Honduras, Rehn Coll.; also listed from Tela, Honduras).

History. Francis Sumichrast, a noted Swiss collector-naturalist, resident in Mexico from about 1855 to his death in 1882, collected the type, the first known specimen of this species. It was forwarded to the Smithsonian Institution sometime prior to 1866, in

which year Cope (1866) published a description. The type, which is still extant and in surprisingly good condition, is an old male specimen in which practically all trace of juvenile color and markings has been lost. The tail is regenerated. The type locality was given by Cope as "Orizava," but the tag bears the inscription "Potrero" (No. 4, F. Sumichrast). This village is Potrero (or El Potrero) situated on the highway between Orizaba and Vera Cruz, a few kilometers beyond Córdoba.

In 1882 Sumichrast published some notes on his collections, and states that he had found the species "en los encinales de Potrero, cerca de Córdoba a una altura de 590 metros." This must be regarded as the type locality. Günther (1885) states that Sumichrast found *two* specimens of this species in the oak woods at a height of 1,800 feet.

The first specimen known to have reached Europe was a young one, collected at Jalapa, by C. T. Hoege. The specimen became a part of the collections in the British Museum and was available to Boulenger when his third volume of the catalogue of the lizards was written (1886). He describes the markings of this specimen, comparing it with *lynxe:* ". . . light vertebral line (in the young) bifurcating on the frontal, as in *E. lynxe*, enclosing a dark rhomboidal spot on the forehead."

In 1895 Alfredo Dugès obtained a young specimen collected by Jose N. Rovirosa at "Mineral de Santa Fé in Chiapas." He described it under the name of *Eumeces Rovirosae* and published a figure of the form in color. This specimen, which I examined, has indeed been "muy mal tratado del vientre, cuello y ano," as suggested by Dugès. It was impossible to determine the total number of scales round the body, but, judging by the rows on back and sides, the number is 28 or 30. He notes the similarity of the markings to *E. lynxe,* and likewise notes the distinguishing characters. The type, unnumbered, is now in the Alfredo Dugès museum in Guanajuato, Mexico.

In 1930 (July-September), while on an expedition to Honduras, two specimens of this species were encountered by J. A. G. Rehn, one at Tela, and one at Lancetilla, Honduras. This latter specimen, now A.N.S.P. No. 19877, was made the type of a new species, *Eumeces schmidti,* by Dunn.

The disposal of *Eumeces rovirosae* and *Eumeces schmidti* in the synonymy of *sumichrasti* may seem, on superficial consideration, surprising, since both are five-lined forms, with the median line

bifurcating on the *posterior part* of the frontal, a character unique in the genus. (In most forms having the median line the bifurcation is on the first nuchals or the back part of the interparietal; in *lynxe* and *furcirostris* the line bifurcates on the *middle of the frontal.* The point of bifurcation is practically constant for a species, so far as data on the genus goes.) On the other hand, *sumichrasti* is described as a species lacking all trace of lines on the body. Since many species (notably those of the *Fasciatus* group) tend to lose most or all of the juvenile pattern of coloration in the adult males, it is the anticipated condition in both *rovirosae* and *schmidti.*

It has been most fortunate that I have been able to examine the types of the three forms, including the cotype of *schmidti;* and also, I have at hand a superb photograph of the Hoege specimen of *sumichrasti,* in the British Museum, which was kindly prepared for me by Mr. W. H. Parker. I synonymize them for the following reasons:

First, the geographical probabilities considered, we find the type locality of *rovirosae* situated approximately 275 miles from that of *sumichrasti;* that of *schmidti,* approximately 650 miles. Second, all the localities are at low elevations: *sumichrasti,* 590 meters in forest; *rovirosae,* unknown (probably no higher); *schmidti,* coastal plain rain forest region; so that they may be generally considered as lowland forms primarily (one record for Jalapa may be higher). Third, the variation observed is well within normal variation to be anticipated in the species. The table of measurements, and the discussion under variation, will show more details of the similarities, and the absence of pertinent characters in the material now available, that would warrant the retention of either, even as subspecies. This does not, of course, preclude the possibility that larger series will show size differences and possibly other characters which would necessitate a different interpretation of the status of either one or both of the forms.

Diagnosis. A large species of the genus characterized in the young and middle aged by the presence of a median line extending the length of the body and onto tail, bifurcating on the posterior part of the frontal; a dorsolateral line covering the edges of the third and fourth scale row the length of the body, and a lateral line involving the lower half of ear, and extending onto tail. Limbs, large, broadly overlapping in young and adults; scale rows, 28 to 30 about middle of the body; no postnasal; one postmental (normally); seven or eight upper labials; the postgenial (normally)

bordered medially by a scale longer than wide; rostral low; the prefrontals forming a suture; seventh labial separated from upper secondary temporal.

Description of type. Rostral low, the portion visible above only about a half the size of the relatively small frontonasal; supranasals large, forming a median suture somewhat shorter than that formed with rostral, their greatest width about three fourths their length; the frontonasal relatively small, in contact laterally with the anterior loreal; prefrontals very large proportionally, apparently equalling area of frontonasal, forming a broad suture mesially, laterally in contact with two loreals, narrowly with the first, while

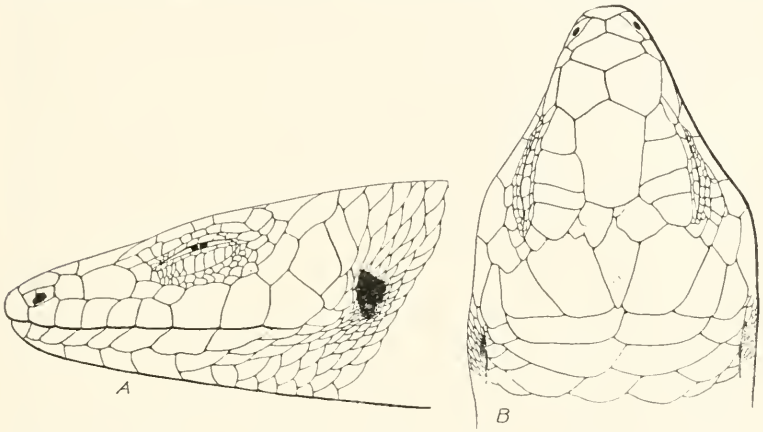


FIG. 21. *Eumeces sumichrasti* (Cope). Type, U.S.N.M. No. 6601; Potrero, Mexico. A, lateral view of head; B, dorsal view of head. Actual head length, 16.2 mm.; width, 15 mm. The depth of the head is slightly greater than the drawing shows. Drawing by Dr. Doris Cochran.

the suture with the second is three times as long; the suture with the first superciliary smaller than that with the first supraocular; frontal distinctly shorter than the distance from frontal to end of snout, reaching only the rostral; anterior angle of frontal is very obtuse, wide anteriorly, diminishing in width gradually; posterior end slightly rounded rather than angular; frontoparietals abnormal; left divided into two parts (nearly into three); right separated from frontal and from left frontoparietal by a series of three small scales (one expects these normally absent); the interparietal relatively slender, enclosed, narrowly, by the parietals; two pairs of nuchals, the posterior edges strongly curving; nasal rather large, divided by sutures, the anterior part strongly triangular, not or but slightly larger than the posterior part; postnasal absent; anterior loreal about equal in height to the larger posterior loreal; superciliaries

9-8, the anterior large, touching prefrontal; four supraoculars, three touching the frontal; a relatively large preocular; two presuboculars; two very small postoculars; four postsuboculars. Eight upper labials, five preceding the subocular, of which the first is the largest, but no higher than the three succeeding labials; eighth labial no higher than seventh, but distinctly larger than any other in series; primary temporal large; upper secondary temporal wider posteriorly than anteriorly, lower secondary somewhat fan-shaped, touching the primary; the tertiary temporal small, separated from eighth labial and ear; two pairs of postlabial scales, each pair superimposed, of which the lower is larger in each case; three preauricular lobules, closely flattened against the anterior border of the ear opening; mental with a longer labial border than the rostral, relatively deep; normally a single postmental (anterior upper part of this scale in the type is abnormally divided, the anterior part not touching labials); three pairs of chinshields, the anterior pair in contact. The postgenial following third pair rather short, longer than wide, segmented longitudinally on one side, single on other; 7-6 lower labials.

Scales of the body generally uniform, the median series no larger than adjoining scale rows, those on side not or only slightly smaller than dorsal scales. Scale rows behind ear, 35; around constricted part of neck, 30; about axillary region, 38; about middle of body, 28; six preanal scales, median pair broadened, the outer pairs small, overlapping inner; median subcaudals much wider than adjoining scales, but not, or but slightly more than, double their depth; an area of small tubercular nonimbricating scales in axilla, a few of which continue above and slightly anterior to forearm; 21 scales about insertion of foreleg; a few enlarged tubercles on posterior edge of palm, with smaller tubercles intermingled; basal lamellae on toes padlike; lamellar formula for fingers: 6; 9; 13; 13; 8; and 6; 9; 13; 13; 9. Formula for toes: 7; 11; 14; 15; 12; and 7; 11; 14; 17; 13. Four large scales on heel; outer side of sole with large, flat imbricating scales; inner side with smaller tubercles and three of these somewhat enlarged. Pitting on the scales is practically obsolete.

Color (in alcohol). Generally olive-gray, the scales showing darker areas, with a faint lateral stripe of brown; a median dorsal light line is visible for a short distance behind nuchals, but disappears on shoulders; a faint dorsolateral light line evident on sides of neck only; no evidence of a lateral line; head brownish-

yellow, slightly darker in frontal region, and browner in temporal region; chin, tip of snout, breast, and under side of limbs lighter; tail above apparently slightly more brownish.

Measurements of *Eumeces sumichrasti* (Cope)

Museum Number Sex	Type *sumichrasti* U.S.N.M. 6601 ♂	Type *schmidti* A.N.S.P. 19877 ♂	Paratype *schmidti* Field M. 18004 ♀	Type *rovirosae* A. Duges yg.
Snout to vent	96	48	64	26
Tail	.....	.....	.....	45
Snout to eye	9	4.1	5.5	.....
Snout to ear	18.6	10	12.5	.....
Snout to foreleg	29.5	20	22.3	.....
Foreleg	28	14	19	10
Hind leg	36	19	25	14
Axilla to groin	51	22	36	.....
Width of head	15	8.3	10	.....
Length of head	16.2	9.3	11.5	.....
Width of body	.....	8.8	14	.....
Postanal width	.....	6.2	7.6	.....
Longest toe	14	8	11.3	.....

Variation. The variations in color and markings noted are those having to do with the normal color evolution between young and old. The following description is drawn from the young Jalapa specimen, from photograph; from the types of *"schmidti,"* and from the type of *"rovirosae."* The details are identical in all. It will be noted that the types of *"schmidti"* have been darkened by their preserving fluid (presumably formalin), and the colors are doubtless changed and the markings somewhat obscured.

Color of young: Ground color black or brownish-black; a narrow median cream or yellowish line extends the length of the body and some distance on the tail; on the posterior part of the frontal it bifurcates, reuniting on the rostral; a similarly colored dorsolateral line begins on the anterior supraocular or prefrontal, extends the length of the body on the edges of the third and fourth scale rows to some distance on the tail; along the sides from the labials to the tail is a narrow lateral yellowish line involving lower half of the ear, and interrupted by the insertion of the hind leg; a dim postfemoral light line; on sides the ground color is more intense, and in

older specimens becomes a broad, lateral dark-brown stripe from loreal region to side of tail, covering about two and one half scale rows; the lateral light line bordered below by a narrow dark line that merges with the ground color of the abdomen. The tail is a brilliant blue, fading to grayish-black in older specimens; the abdomen is bluish-gray, the chin, throat, and breast yellowish-white or cream.

In older specimens, 48 to 64 mm., the ground color begins to grow lighter, taking on a gray-brown color, leaving the whitish lines bordered with continuous dark lines; the ground color of the head

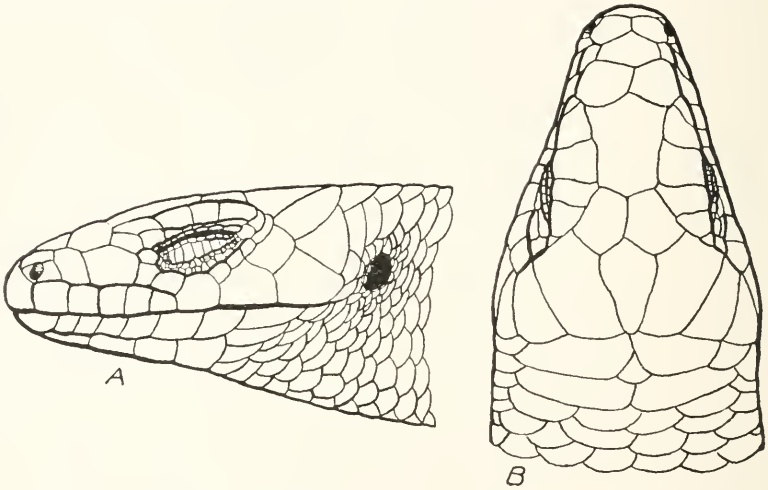


FIG. 22. *Eumeces sumichrasti* (Cope). Paratype, *E. schmidti* Dunn. F.M.N.H. No. 13004; Tela, Honduras. A, lateral view of head; B, dorsal view of head. Actual head length, 11.5 mm.; width, 10 mm.

becomes somewhat spotted with lighter and darker brown. In the old males the color becomes more or less uniform, while in the females (no specimens seen) the juvenile color pattern is likely to be retained to a greater degree. The pitting on scales is distinct, there being five to seven pits present.

In the three type specimens of *sumichrasti, schmidti,* and *rovirosae,* the following characters are the same, save where variation is noted. The variation in scale rows about the body is from 28 to 30; of the two *schmidti* specimens, one has 29, one 30, while *sumichrasti* has only 28; the rostral is low, the part visible above, small; supranasals invariably in contact; frontonasal broader than long, forming contacts with the anterior loreal; the prefrontals

broadly in contact; supraoculars 4-4, three touching frontal (2-2 in *rovirosae,* the third narrowly separated); upper labials 8-8 in *sumichrasti,* 8-7 or 7-7 in *schmidti,* 7-7 in *rovirosae;* postnasal absent; postmental single (abnormal in paratype of *schmidti,* being double); nuchals two pairs, the posterior strongly curving (probably two pairs in *rovirosae;* the specimen is injured); parietals in *sumichrasti* (type; not in Jalapa specimen) forming a suture, separated in *schmidti* specimens; frontoparietals as large as prefrontals or slightly larger; scales under tail strongly widened; nasal divided by sutures; presuboculars 2-2; postsuboculars 4-4; superciliaries 8-9 or 9-9; the temporals in the specimens of all agree save that in the type of *schmidti* the seventh labial is in contact with the upper secondary temporal, separating the primary and lower secondary. The paratype, however, agrees with the condition in the other specimens of *sumichrasti;* the lamellae under the fourth toe vary: 15-17 in *sumichrasti;* 17-17 in *schmidti;* 19-19 in *rovirosae.* It will be observed that none of the variations are of such a nature that they might not occur in the same species in a single locality.

Remarks. That a species so large and conspicuous should remain so rare in collections is a matter of surprise, occurring as it does through so wide a territory, and having been discovered so early in the faunistic exploration of Mexico. Little is known of habits save that it occurs in forests at relatively or very low elevation, but may also attain considerable elevation if the locality "Jalapa" on the British Museum specimen is trustworthy.

The single adult female (*schmidti*) contains ripe eggs in the oviducts. No evidence of developing embryos was discernible in one egg examined. It is presumed that the form is oviparous.

Distribution. Apparently the species is confined to the lowland region on the east of the southern part of the Mexican plateau, and extending through the isthmus to Honduras. As it appears to be a woodland form, it should be looked for in the peninsular area occupied by Tabasco, Yucatán, Campeche, Guatemala and British Honduras. A specimen in the British Museum labelled *sumichrasti,* a photograph of which I have, appears to be *tetragrammus* or a related form, judging by the color pattern and short legs.

Locality records:

Vera Cruz: "Encinales de Potrero, cerca de Córdoba" (type locality, U.S.N.M. [No. 6601] 1, Sumichrast Coll.); Jalapa (spelled Xalapa on recent Mexican maps) (Brit. M. 1, yg., Hoege Coll.).

CHIAPAS: Mineral de Santa Fé (type locality *E. rovirosae,* Alfredo Dugès Mus. 1, Rovirosa Coll.).

HONDURAS: Tela (Field Mus. 1, paratype *schmidti;* Rehn Coll.); Lancetilla (type locality *schmidti,* A.N.S.P. [No. 19877] 1, Rehn Coll.).

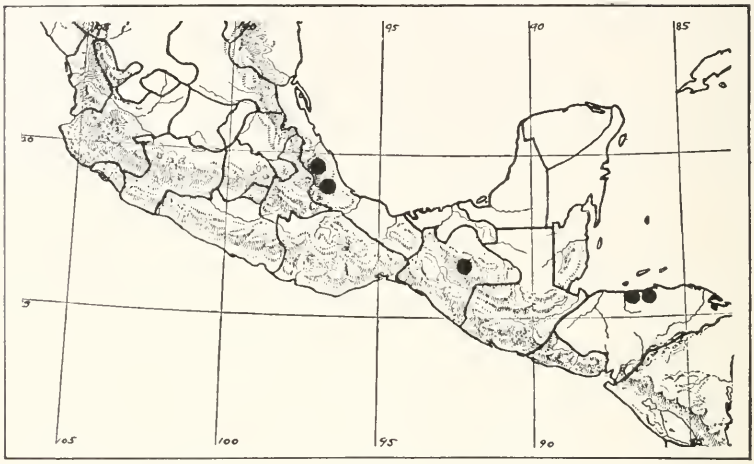


FIG. 23. Distribution of *Eumeces sumichrasti* (Cope), in Mexico and Central America.

FASCIATUS GROUP

This group occupies the territory in the United States and southern Canada east of the 98th meridian and in Asia in North and Central China reaching near Tibet in the west and southern Siberia in the north. They are present in the line of islands of the eastern coast of Asia as far as Formosa and the Pescadores.

The similarities between the Asiatic and American species are of such a nature that it seems beyond peradventure that they are closely related and bespeak a direct land connection between their present area of distribution to the exclusion of the territory to the west of the 98th meridian.

The striking thing regarding the two groups is the small extent of modification that obtains between certain Asiatic and eastern American forms, in some cases so small that they were originally placed in the same species.*

Twelve species, three American and nine Oriental, are included.

* This same close relationship is likewise apparent in *Leiolopisma* of this same lizard family (Scincidae).

KEY TO THE SPECIES OF THE FASCIATUS GROUP

PAGE

A. Subcaudals very narrow (unless tail reproduced); young usually with a sublateral line; the bifurcating lines on head do not or rarely join to the median line on nuchals; seven or eight labials; scales 28–30 rows. (Southeast U. S.) . . . *Eumeces inexpectatus* Taylor, 224

AA. Subcaudals strongly widened.

B. No strongly keeled lateral postanal scale.

C. A well-developed patch of enlarged scales on posterior border of femur; upper secondary temporal more or less triangular, emarginate behind, notched below; lower, nearly parallel-sided; two postmentals; one postnasal. (China) . . . . . *Eumeces tunganus* Stejneger, 234

CC. No patch of enlarged scales on posterior side of femoral region.

D. Large species (120 mm.); scale rows usually 30–32; upper secondary temporal not triangular, not emarginate; lower secondary not parallel-sided, but usually more or less fan-shaped; intercalated scales between upper and lower lamellae of fourth toe extend to near the distal phalanx; a sublateral line in eastern forms, none in western; head red in old males; usually only one postlabial, or two very small ones. (Southeast U. S.) . . . . . *Eumeces laticeps* (Schneider), 212

DD. Smaller, max. size 80 mm.; scale rows 28–30; head not red in old males; intercalated scales on fourth toe extend but little beyond basal phalanx; two, rather large, postlabials. (Eastern U. S.)

Eumeces fasciatus (Linnaeus), 188

BB. A strongly keeled lateral postanal scale.

C. A postnasal normally present; one or two postmentals.

D. Two postmentals; a well-defined patch of irregular enlarged scales on posterior side of femur; upper secondary temporal with sides anteriorly more or less parallel, rounded posteriorly; lower secondary more or less fan-shaped; 76 mm. length; 22-24 scale rows; usually 2 nuchals. (China) . . . . . *Eumeces xanthi* Gunther, 239

DD. One postmental; upper secondary temporal triangular, emarginate posteriorly; lower secondary with sides more or less parallel.

E. Scale rows 22; five-lined species, the median bifurcating on nuchal; frontonasals forming suture or not; seven labials; two pairs of nuchals; max. size 66 mm. (Amamioshima.)

Eumeces barbouri Van Denburgh, 265

EE. Scale rows more than 24.

F. Scale rows 28–30, usually 28; loreal variable, sometimes divided transversely, often separated from the labials; no evidence of scale patch on femur; median line not bifurcating on head; prefrontals always separated. (Idzu Islands.)

Eumeces okadae (Stejneger), 272

FF. Scale rows 24–26, usually 26; no trace of a patch of enlarged scales on femur; prefrontals forming suture or not; posttemporal scales not strongly differentiated; usually one pair nuchals; max. size 80 mm. (Larger Japanese Islands.)

Eumeces latiscutatus (Hallowell), 276

CC. No postnasal; one postmental.

D. Seven-lined; a sublateral line; lateral passing above ear; 24–26 scale rows; posttemporals modified; median line bifurcating on head; nuchals, one pair; upper labials, seven; 63 mm. max. size. (Ishigakijima.)

Eumeces stimsonii Thompson, 260

DD. Five-lined; no sublateral line, the lateral passing through ear.

E. The patch of scales on posterior part of femur strongly defined; three scales following upper temporal, well differentiated; scale rows 26–28; frontonasals usually separated; seven or frequently six upper labials; very frequently only two supraoculars touch frontal; 93 mm. max. size. (China)

Eumeces elegans Boulenger, 245

KEY TO THE SPECIES OF THE FASCIATUS GROUP—*Concluded*

PAGE

EE. Patch of irregular scales on posterior side of femur not or but scarcely defined; seven upper labials; three supraoculars in contact with frontal; usually 26 scale rows.

F. Median series of scales usually distinctly widened; the white lines extend on tail one half to three fourths length; the dorsolateral line follows middle of the third scale row. (Riu Kiu Is.) ..... *Eumeces marginatus* (Hallowell), 267

FF. Median series of scales less widened; light lines extend less than one third the length of tail; dorsolateral line passes along back, along the edges of the third and fourth scale rows. (Northern Riu Kiu Is.)

Eumeces oshimensis Thompson, 253

Eumeces fasciatus (Linnaeus)

(Plate 13; Figs. 24, 25, 26, 27)

SYNONYMY *

1758. *Lacerta fasciata* Linnaeus. Syst. Nat., Ed. 10, I, 1758, p. 209 (type description based on Catesby's drawing in Nat. Hist. Car., vol. II, pl. 67; type locality, Carolina); and Ed. 12, I, 1766, p. 366; Dondorff, Zoöl. Beit., III, 1798, p. 120, No. 40; Shaw, Gen. Zoöl., London, III, 1802, p. 241 (noted as a small species); Garman, Bull. Essex Inst., XVI, 1884, p. 14 (under *Eumeces*).

1766. *Lacerta quinquelineata* Linnaeus. Syst. Nat., Ed. 12, I, 1766, p. 366 (type description, based presumably on a description made by Doctor Garden from specimens observed in Carolina); Meyer, Synop. Rept., 1795, p. 29; Dondorff, Zoöl. Beit., 1798, p. 120, No. 24; Shaw, General Zoölogy, III, 1802, p. 241; Green, Journ. Acad. Nat. Sci. Phila., IV, pt. 2, 1818, p. 284, pl. XVI, fig. 2 (5-*lineata* var.).

1801. *Scincus quinquelineatus* Schneider. Hist. Amph., II, 1801, p. 201 (part.); Daudin, Hist. Nat. Rept., IV, 1802-'03, p. 272, pl. LV, fig. 1; Merrem, Tent. Syst. Amph., 1821, p. 72; Kuhl, Beitr. Zoöl. Vergl. Anat., Frankfort, 1820, p. 128; Harlan, Journ. Acad. Nat. Sci. Phil., VI, 1829, p. 10 (part.); and Med. Phys. Res., 1835, p. 138, and 161 (part.); Holbrook, N. Amer. Herp., III, 1839, p. 39 (the plate VI is a reproduction of *inexpectatus*); Storer, Boston Journ. Nat. Hist., III, 1840, p. 219 (Barre, Mass.); Latreille, Hist. Nat. Rept., II, p. 74, fig. p. 64, No. 3.

1801. *Scincus auratus* Schneider. Hist. Amph., Fasc. II, p. 182, Var. A. (part.); Merrem, Tent. Syst. Amph., 1821, p. 71 (part.).

1839. *Scincus lateralis* Saeger. Silliman's Journ., 1839, pp. 323-324 (Detroit, Mich.).

1839. *Plestiodon quinquelineatum* Duméril and Bibron. Erp. Gén., V. 1839, pp. 707-708 (part.); DeKay, Zoöl. New York, Pt. III, Reptiles and Amph., Albany, 1842, p. 30 (Pennsylvania to Florida); Linsley, Amer. Jour. Sci. Arts, (1), 46, 1843, p. 41; Gray, Cat. Spec. Liz. Coll. Brit. Mus., 1845, p. 91 (part.); Gravenhorst, N. Acta. Ac. Leop. Carol., XXIII, 1851, 1, p. 350, pl. XXXV (part.) (No. 1 is same specimen as described by Schneider from the "Lampeschen sammlung;" not type of *Eumeces laticeps*); Jan, Cenni. Mus. Civ. Milan, Ind. Sist. Rett. Anf., Milan, 1857, p. 6 (Georgia); (?) Maximilian, Verz. Rept. Reise Nord. Amer. beob. wurd., Dresden, June, 1865, pp. 63-64 (either *fasciatus* or *laticeps*) (between Natchez and Memphis); Wright and Funkhouser, Proc. Acad. Nat. Sci. Phila., Mar., 1915, pp. 134-136 (part.) (Georgia; a good account of three species [*fasciatus*, *laticeps* and *inexpectatus* considered as one.]); Schmidt, Journ. Elisha Mitchell Sci. Soc., XXXII, Apr., 1916, No. 1, p. 36 (North Carolina?); Dunn, Bull. Amer. Mus. Nat. Hist., 37, 1917, pp. 596, 597, 627 (North Carolina) (part.).

1842. *Scincus fasciatus* var. DeKay. Zoöl. New York, Rept. Amph., 1842, pp. 29-30.

1856. *Plestiodon vittigerum* Hallowell. Proc. Acad. Nat. Sci. Phil., 1856, p. 310 (type description; type locality, Flint, Mich. Doctor Miles Coll.).

* The correct placing of the synonymy of this species is difficult owing to the confusion in the literature of three species, *fasciatus, laticeps,* and *inexpectatus.* It is not impossible that certain of these refer only to one or both of the two other species mentioned.

1859. *Plestiodon fasciatus* Baird. Expl. Surv. R. R. Route Pacific Ocean, 1859, Zoöl. Rept., Pt. 4 (Fort Smith, Ark.); Allen, Proc. Boston Soc. Nat. Hist., XIII, 1870, pp. 260-263 (New Bedford, Mass.); Allard, Sci., XXX, 1909, pp. 122-124; Fowler, Copeia, No. 146, Sept. 20, 1925, p. 59 (Delaware), p. 63 (Maryland), p. 66 (Virginia); Strecker, Contr. Baylor. Uni. Mus., No. 2, Jan. 15, 1926, p. 2; and *idem*, No. 3, Feb. 15, 1926, p. 1; Linsdale, Copeia, No. 164, 1927, p. 78 (Kansas); Stejneger and Barbour, Check List No. Amer. Amph. Rept., 1917, p. 69; Bishop, Copeia, No. 54, 1918, pp. 35-36; Dunn, Copeia, No. 53, 1918, pp. 16-27 (part.); ? Deckert, Copeia, No. 54, 1918, p. 31 (probably not *fasciatus*); Patch, Canadian Field Nat., XXXIII, 1919, p. 60 (Canada); Dunn, Proc. Biol. Soc. Washington, XXXIII, Dec. 30, 1920, p. 136 (part.); Blanchard, Occ. Papers Mus. Zoöl. Uni. Michigan, No. 117, July 6, 1922, p. 7 (part.); Löding, Geol. Surv. Alabama, Alabama Mus. Nat. Hist., Mus. Paper No. 5, 1922, p. 25 (Alabama: part.); Strecker, Bull. No. 4, Sci. Soc. San Antonio, Apr., 1922, p. 31 (Texas); Pratt, Vert. Anim. U. S., 1923, p. 206 (part.); Strecker, Baylor Uni. Bull., XXVII, No. 3, pt. 3, 1924, pp. 37, 38 (part.) (habits); Schmidt, Copeia, No. 132, p. 68 (South Carolina); Force, Copeia, No. 141, Apr. 30, 1925, p. 25 (Okla.).

1868. *Plistodon striatus* Abbot. Geol. New Jersey, 1868, p. 801.

1871. (?) *Plistodon lineatus* Cope. 2d and 3d Ann. Rep. Peabody Acad. Sci., 1871, p. 82 (*lapsus*.).

1875. *Eumeces fasciatus* Cope. Bull. U. S. Nat. Mus., I, 1875, p. 45; (?) Coues and Yarrow, Proc. Acad. Nat. Sci. Phila., 1878, pp. 21-28 (Fort Macon, N. C.); Cragin, Kan. Acad. Sci., VII, 1879-80, (1880), p. 115 (Kansas); Cope, Bull. U. S. Nat. Mus., 17, 1880, p. 18 (part.); Yarrow, Bull. U. S. Nat Mus., 24, 1882, pp. 41-42 (part.) (includes *inexpectatus* and *laticeps*. Numerous localities); Smith, Rep. Geol. Surv. Ohio, V, pt. 1, Zoöl., 1882, pp. 650-651 (part.); Davis and Rice, Bull. Chicago Acad. Sci., I, No. 3, 1883, p. 31 (Illinois); and Ill. State Lab. Nat. Hist., Bull., 5, 1883, p. 47; Cragin, Kan. Acad. Sci., IX, 1883-1884 (1885), p. 137; and Bull. Washburn College Lab., I, No. 3, 1885 (Mar. and Apr.), p. 102 (Kansas); Hay, Ind. State Bd. Agri., Amph. Rept., XXVIII, 1886, p. 214 (author's separate, p. 14); Jordan, Manual Vert. Anim. U. S., 1916, p. 201; Hay, Jour. Cincinnati Soc. Nat. Hist., X, Mar. 30, 1887, p. 59 (Indiana); Abbot, Pop. Sci. Mon., Dec., XXXIV, 1886, pp. 170-171 (text fig.; account of habits; called "blue-tailed skink," the scientific name not mentioned); Nelson, Geol. Survey New Jersey, II, p. 2, Zoöl., 1890, p. 642; Blatchley, Jour. Cincinnati Soc. Nat. Hist., XIV, 1891, p. 33; and Rep. of State Geologist, 1891, pp. 548-549; and Ann. Rep. Ind. Dept. Geol. Nat. Res., 1892, pp. 546-549 (part.); Hurter, Trans. Acad. Sci. St. Louis, Dec. 12, VI, 1893, p. 259; ? Loennberg, Proc. U. S. Nat. Mus., XVII, Nov. 15, 1894, p. 321 (very doubtfully *fasciatus*) (Florida); Garman, H., Bull. Essex Inst., XXVI, 1894, p. 34 (Kentucky); Rhodes, Proc. Acad. Nat. Sci. Phila., 1895, pp. 386-387; Mearns, Bull. Amer. Mus. Nat. Hist., X, 1898, p. 326; ?McLain, Contr. N. Amer. Herp., Feb. 1899, pp. 1-5 (part.); Smith, Proc. Linnaean Soc. New York, No. 11, 1899, p. 18 (p. 9, author's separate); Beyer, Proc. Louisiana Soc. Nat., 1897-1899 (1900), pp. 25-46 (part.); Atkinson, Ann. Carnegie Mus., Bull. I, 1901-1902, p. 154 (Pennsylvania); Gibbs, Morris, Notestein, Clark, 7th Ann. Rep. Mich. Acad. Sci., 1905, p. 110 (Michigan); Stone, Amer. Nat., XL, No. 471, Mar., 1906, p. 168 (Pennsylvania, New Jersey, Delaware); Fowler, Ann. Rep. New Jersey State Mus., 1906, pt. II pp. 195-196 (text fig., *laticeps*; pl. 50, *inexpectatus*, copied from Holbrook) (New Jersey); Surface, Zoöl. Bull. Dept. Agri. (Penn.), V, No. 8, 1908, pp. 249-251, pl. 31 (also p. 248, and fig. 26); Brimley, Proc. Biol. Soc. Washington, XXII, June 25, 1909, p. 133 (Craven Co., North Carolina); *idem.*, Mar. 23, 1910, p. 12 (Mississippi, Georgia, Florida [part.]); Somes, Proc. Iowa Acad. Sci., 18, 1911, p. 150 (Iowa); Dunn, Copeia, No. 18, May 15, 1915, p. 6 (Virginia); Stejneger and Barbour, Check List No. Amer. Amph. Rept., 2d Ed., 1923, p. 75 (part.); (?) Meyers, Copeia, No. 131, June 30, 1924, p. 61 (North Carolina); Blanchard, Papers Mich. Acad. Sci. Arts Letters, IV, 1924, pp. 535-536 (Missouri and Illinois) (part.); *idem*, V, 1925, pp. 367-388 (Kentucky and Indiana); Strecker, Contr. Baylor Mus., No. 5, May 15, 1926, p. 6 (part.) (Texas); idem., No. 7, July 15, 1926, p. 7 (Texas); Bishop, Copeia, No. 152, Mar. 25, 1926, p. 118 (Kentucky); Ortenburger, Copeia, No. 155, June 24, 1926, p. 138 (Okla.); Netting, The Pittsburg Naturalist, I, No. I, Jan., 1926, p. 7 (Pennsylvania); Ortenburger, Uni. Okla. Bull., Proc. Okla. Acad. Sci., pt. 1, VI, 1926, p. 95 (Oklahoma); Brimley, Jour. Elisha Mitchell Sci. Soc., XLII, 1926, p. 83 (part.); (?) Pickens, Copeia, No. 165, Dec., 1927, p. 111 (part.); Strecker, Contr. Baylor Uni. Mus., No. 10, Mar. 15,

1927, p. 14 (Enemies); idem., No. 16, pp. 1-21 (part.); Strecker and Williams, Contr. Baylor U. Mus., No. 17, Oct. 20, 1928, p. 15; Burt, Trans. Acad. Sci. St. Louis, XXVI, No. 1, Aug., 1928, pp. 51-56 (Map of distribution, fig. 11.) (Kansas); Blanchard, Copeia, No. 167, 1928, p. 47; Ruthven, Thompson, Gaige, Michigan Hand Book Series, Herp. Mich., 1928, pp. 66-70, pl. 13, fig. 3 and map; Roddy, Rept. Lancaster County and State of Penn., 1928, pp. 48-50 (Pennsylvania); Pope and Dickinson, Bull. Pub. Mus. City Milwaukee, VIII, No. 1, 1928, p. 46, pl. 10, fig. 2 (Wisconsin); Gloyd, Trans. Kan. Acad. Sci., XXXI, 1928, p. 120 (Kansas); Burt, Jour. Kan. Ent. Soc., I, No. 3, 1928, pp. 50-68; Ortenburger, Copeia, No. 170, 1929, pp. 11, 27 (Oklahoma); Strecker, Contr. Baylor Uni. Mus., No. 19, Sept. 1, 1929, p. 13 (Texas); Cahn, Copeia, No. 170, Apr. 30, 1929, p. 6 (Wisconsin); Corrington, Copeia, No. 172, Nov. 15, 1929, pp. 68-69 (South Carolina); (?) Burt and Burt, Amer. Mus. Nov., No. 381, Nov. 2, 1929, p. 9; Klotts, Copeia, No. 173, Jan. 16, 1930, pp. 107-108 (New Jersey); Ortenburger, Copeia, No. 173, Jan. 16, 1930, pp. 94-95 (Oklahoma); Babcock, Boston Soc. Nat. Hist., No. 57, Oct., 1930, pp. 11-12 (and fig., p. 10); Netting, Ann. Carnegie Mus., XIX, No. 3, Jan. 21, 1930, pp. 171, 172 (Pennsylvania); (?) Weller, Proc. Junior Soc. Nat. Sci., I, 1930, pp. 9-11; Meyers, Copeia, No. 173, Jan. 16, 1930, p. 101 (New Jersey); Noble and Teal, Copeia, No. 2, 1930, June 30, pp. 54-56 (breeding habits); (?) Harper, Copeia, No. 4, 1930, p. 154 (Georgia); Conant, Bull. Antiv. Inst. Amer., IV, No. 3, 1930, p. 63 (part.); Force, Copeia, No. 2, 1930, p. 29 (Oklahoma); Bond, Copeia, No. 2, 1930, p. 54 (West Va.); McCoy, Bull. Boston Soc. Nat. Hist., No. 59, 1931, pp. 25-33 (Key); Weller, Guide to Exh. Amph. and Rept. Cincinnati Soc. Nat. Hist., 1931, p. 4; Haltom, Alabama Mus. Nat. Hist., Uni. Alabama Museum Paper, No. 11, 1931, p. 118; Gloyd, Pap. Mich. Acad. Sci. Arts Letter, XV, 1931, pp. 393, 401; Taylor, Uni. Kansas Sci. Bull., XX, No. 13, Oct. 1, 1932, pp. 251-258, pl. 261 (comparison with *inexpectatus*); *idem*, pp. 263-268 (comparison with *laticeps*); Kingman, Kansas Sci. Bull., XX, Oct. 1, 1932, pp. 273-287, pl. XXIV, fig. 3 (skull characters); Burt, Copeia, No. 2, 1932, p. 104 (eliminated from Colorado list); Stejneger and Barbour, Check List N. Amer. Amph. Rept., 1933, p. 81; (?) Burt, Amer. Midland Nat., XIV, 1933, pp. 170-173 (Missouri); (?) Van Hyning, Copeia, No. 1, Apr. 3, 1933, p. 5 (Florida); Noble and Mason, Amer. Mus. Nov., No. 619, May 11, 1933, pp. 1-19 (breeding habits); (?) Necker, Bull. Chicago Acad. Sci., V, No. 1, Jan. 26, 1934, p. 2 (Tennessee); Dury and Williams, Baker-Hunt Found. Mus. Bull. 1, Nov., 1933, p. 14 (Kentucky record).

1878. *Eumeces striatus* Cope. Proc. Amer. Philos. Soc. 1878, p. 65 (*lapsus*).

1879. *Eumeces quinquelineatus* Bocourt. Miss. Sci. au Mexique, Liv. 6, 1879, pp. 426-428, pl. XXII E, fig. 10-10a, 10b, 10c (part.) (*fasciatus*; possibly also *laticeps* and *inexpectatus*); Hurter, Cat. Rept. Batr. Coll. Missouri (privately printed), 1883, pp. 1-8; Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 269 (part.); Boettger, Cat. Rept. Samm. Mus. Senckenb. Nat. Gesell., Teil. I, 1893, pp. 110-111 (part.); Cope, Ann. R p. U. S. Nat. Mus., 1898 (1900), pp. 632-640 (part.); Strecker, Trans. Texas Acad. Sci., IV, pt. 2, 1901 (1902), p. 3 (Texas); Paulmier, in New York State Mus. Bull., 51, Apr., 1902, p. 390 (New York); Brown, Proc. Acad. Nat. Sci. Phila., 1903, p. 558; Stone, Proc. Acad. Nat. Sci. Phila., 1903, pp. 538-542 (Arkansas, Okla. and Texas) (part.); Ditmars, Ann. Rep. N. Y. Zool. Soc., VIII, 1903, p. 160; Morse, Proc. Ohio State Acad. Sci., IV, pt. 3, Special Paper No. 9, 1904, p. 125; Henshaw, Occ. Papers Boston Soc. Nat. Hist., VII, 1904, p. 6 (Mass., Conn.); Gibbs, Morris, Notestein and Clark, 7th Ann. Rep. Mich. Acad. Sci., 1905, p. 110 (Michigan); Bailey, North Amer. Faun., 25, 1905, p. 45 (Texas); Brimley, Jour. Elisha Mitchell Sci. Soc., No. 4, Dec., 1907, pp. 144-160 (Key) (Carolina); Strecker, Proc. Biol. Soc. Washington, XXI, Feb. 29, 1908, p. 49 (Texas); *ibid*, Mar. 21, 1908, pp. 73 (Texas) and 89 (Hot Springs, Ark.); ibid, July 27, 1908, p. 169 (Texas); Hurter, Trans. Acad. Sci. St. Louis, XX, 1911, pp. 140-142 (part.) (Missouri); Ruthven, Mich. Geol. Biol. Surv. Pub., 10, 1911, pp. 263-264 (Michigan); Graenicher, Bull. Wis. Nat. Hist. Soc., IX, 1912, pp. 80, 81 (Wisconsin); Ditmars, The Reptile Book, 1915, p. 196 (pl. LVII; part.), (also part., pp. 201-203); Wright and Funkhouser, Proc. Acad. Nat. Sci. Phila., Mar., 1915, pp. 134-136 (part.) (Georgia); Thompson, Occ. Papers Mus. Zoöl. Uni. Michigan, No. 18, Dec. 15, 1915, p. 4 (Northern Peninsula Mich.); Ellis, 19th Rep. Michigan Acad. Sci., 1917, pp. 45, 48, 52, 55 (Michigan); (Anon.), Okla. Geol. Surv., Circ. 6, 1917, pp. 34-35; Over, South Dakota Geol. Nat. Hist. Survey, Bull. 121 (Series XXIII, No. 10, Bull. Uni. S. D.), 1923, p. 20 (South Dakota); Ditmars, Reptiles of the World, 1928, pp. 183-185 and 197 (part.).

History. Probably no group of species has been more confused or misunderstood than that composed of *Eumeces fasciatus, laticeps* and *inexpectatus*, and perhaps there is no taxonomic problem more involved than that which concerns associating the correct name with the various forms. That there are three distinct and well-defined species cannot be doubted by anyone who will take time enough to examine them in series.

Pre-Linnaean literature on the forms is not extensive, and apparently no effort was made to differentiate the species. The earliest records I find are those of Petiver,* who figures a form under the name *Lacerta marinus minor caudâ caeruleâ.*

Petiver's figures are such that Holbrook (1842) states concerning the last (Petiver, 1702): "which reference must go for little as no one can positively determine at this time what animal Petiver had in view."

Harlan (1835) gives the following reference, "S. (*cincus*) *Americanus* Petiver gaxophylacii Naturae et Artis 1711 tab. 69. fig 13," and on this basis uses the name *Scincus americanus* for a specimen eleven inches in length from the southern states in the collection of the Academy of Natural Sciences, Philadelphia.

Marc. Catesby,† in his Natural History of Carolina, Florida, and the Bahama Islands, London 1751-1754 (2 vols. in folio, pls. 1-120), gives a figure of a lizard which he called *Lacerta caudâ caeruleâ,* from Carolina; a figure which apparently can be distinguished as the smallest of the three species that occur in Carolina.

Linnaeus, in the 10th edition of the Systema Naturae (Vol. 1, 1758, p. 209), based the species *Lacerta fasciata* on Catesby's *Lacerta caudâ caeruleâ,* and gives as a second reference, Petiver, Gaz. Nat. et Artis, pl. 1, fig. 1. Linnaeus' description is very brief, the descriptive data being taken from Catesby's picture and description of the lizard.

In the 12th edition of the Systema Naturae, Linnaeus (1766) lists two species of lined skinks from Carolina, *Lacerta quinquelineatus* appearing on page 366, and *Lacerta fasciata* on page 369. The former was included on the basis of a description sent to Linnaeus (apparently) by Doctor Garden, of Charleston. Here again, the data recorded are so general in nature that no clue can be found to determine which of the forms the Garden description may

* Musei Petiveriani centuriae, X, rariora continentes, London, 1695-1705, Vol. 1, pl. 1, fig. 1; and Gazophylacii naturae et artis decades, London, 1702. Folio, pls. 1-100 (pl. 69, fig. 13) (1711, *fide* Harlan, 1835).

† Also issued in Nurenburg, a Latin and German edition entitled "Piscium et Serpentum imagines quas Marcus Catesby tradidit." 1750-1777, 2 vols. in foliis, pls. 1-109.

FIG. 24. *Lacerta caudâ caeruleâ.* From Catesby, "The Natural History of Carolina, Florida and the Bahama Islands," vol. II, pl. 67. Somewhat reduced.

have referred to, and the name *quinquelineatus* apparently cannot be applied certainly to any of the three forms of blue-tailed skinks.

Gmelin, in the 13th edition of the *Systema Naturae,* retains the forms as given in the 12th edition.

Certain references to these Carolina skinks appear in works of authors who did not recognize or follow the binomial nomenclature of Linnaeus. In Lacépède's Histoire Naturelle des Quadrupèdes Ovipares et des Serpens (1788-1790), the name *Le Lézard Strié* was used for one form (vol. II, p. 116) and *Le Lézard à queue bleue* (vol. II, pp. 79-80) for the other.

Here again one cannot certainly state which name applies to these species. Daudin, in Latreille, Histoire Naturelle des Reptiles, refers to *Le scinque à cinq raies.*

Daubenton (Louis-Jean-Marie) in his work (Les Quadrupèdes Ovipares et les Serpens [the second volume of l'Encyclop. method Dict. Erpet]) recognizes two forms: *Le Lézard à queue bleue,* and *Le Lézard strié,* based probably on the works of Lacépède.

Schneider (*Amphibiorium naturalis et litterariae, fasciculus secundus*) (1801) recognizes the Linnaean species *quinquelineatus* under his genus *Scincus.* The description of a specimen in the collection of the Museum in Göttingen is brief, and its identity is in doubt. However, Gravenhorst redescribes the specimen (Gravenhorst, 1851, p. 350, pl. XXXV). He gives detailed measurements, and a detailed color description, noting that certain color characters described by Schneider were no longer visible. Gravenhorst lists three Mexican specimens under the same description (perhaps *Eumeces lynxe* Wiegmann).

Schneider, in this same work (pp. 188-190), describes as new a species of skink, *Scincus laticeps,* from a specimen in the Göttingen Museum. The description, while brief, appears to agree with the characters of the form called *laticeps* in this work. No type locality is given. The great widening of the head back of the eye, combined with coloration, seems to point to this form (and apparently can point only to this species), and has been so construed by certain subsequent authors who have recognized the large skinks of the southeastern United States as distinct. Daudin (1802-'03) recognized it; Duméril and Bibron (1839); Gray (1845). However, it does not appear certain that the type was examined by any of these authors. Holbrook (1842, vol. 11, p. 121) places this form under *Plestiodon erythrocephalus* (Guilliams) and states: "I cannot receive the specific name "*laticeps*" for this reptile, because I do not suppose it with them to be identical with *Scincus laticeps* of Schneider. His description is too short and vague to distinguish his animal from those closely allied. And he never saw but one specimen in the museum of Göttingen in which the 'body was a uniform grayish-brown colour above, and the tail had two black spots near the extremity.' "

Regarding the color of the animal, I translate Schneider as "The original color of the specimen in the museum of Göttingen was dark gray ('*erat fusco griseus*'), unspotted save that on the end of the tail two blackish spots were present ('*quod in extrema cauda duae*

negricantes maculae aderunt')." He mentions, also, a picture sent by Doctor Tilesius from Leipzig, as of a specimen belonging to the species, but this is obviously an error of identification, since the specimen is spotted over the body, and the tail is annulated with dark. It would appear that the spots on the tail of the type might be discoloration due to injury or fixation, as no known skink, so far as I am aware, is so marked.

Whether or not this type specimen is extant has not at this time been ascertained.

Shaw, in his General Zoölogy (Vol. III, 1802), recognizes Linnaeus' *Lacerta fasciatus* for the same lizard ("seldom exceeding eight inches in length") occurring in Virginia and Carolina; he restricts the name *Lacerta quinquelineatus* to the form in Carolina. The descriptive material does not differentiate this from the preceding form or from *laticeps*, a species apparently not recognized by Shaw. Daudin, in his Histoire Naturelle des Reptiles, IV, p. 272, pl. LV, fig. 1, describes and figures a form under the name *Scincus quinquelineatus*. The particular species cannot be distinguished by the figure, while the descriptive material makes certain that it must include *laticeps* since he mentions specimens with a length of *"dix pouces trois lignes."* Apparently unaware that Linnaeus had named the lizard pictured by Catesby (see above) *Lacerta fasciata*, he attributes the name *fasciata* to the later edition of Systema Naturae (Ed. XIII) by Gmelin, and states that he regards this a variety of *quinquelineatus*, partly on the evidence furnished him by Bosc, and partly from his own observations.

Daudin also describes in this work a presumed new species under the name *Scincus tristatus*, using a name applied to it by Bosc in a manuscript ("Description Manuscrite Communiquée"). The length given for the type (9 pouc., 1 lign.) makes it certain that this can only refer to *laticeps*. The details given in the description likewise agree with the characters of this species. This is the *Lézard rembruni* of Daudin in Latreille, Hist. Nat. des Rept., Vol. 1, p. 248, fig. 2 (*fide* Daudin, 1803). Should future researches (*i. e.*, the discovery of the type) show the Schneiderian name *laticeps* untenable, this name is apparently the first name certainly available for the large skink. In this work Daudin lists *Scincus laticeps* Schneider and quotes Schneider's description. Noting that it appears to be very close to the scinque rembruni (= *Scincus tristatus*), he suggests the possibility that this may be a presumed African skink, such as one figured by Seba (Thes. 1734-1765, Vol. II, pl. XII, fig. 6).

The first American author to use a binomial for one of the three skinks was Jacob Green (1818), who describes and figures a species under the name *Lacerta quinquelineata* (Jour. Acad. Nat. Sci. Phil., I), and in the same year and in the same publication (pp. 461-462, pl. XVIII, fig. 2) Gilliams (1818) describes as new a form which he calls *Scincus erythrocephalus*. The type locality is Maryland (James Keech coll.). The description makes it evident that the species is *laticeps* Schneider (*tristatus* Daudin). The figure is extremely poor. Thus a third name is definitely ascribed to the large southern form of five- or seven-lined lizard. The type apparently is no longer extant.

Harlan (Journ. Acad. Nat. Sci. Phila., IV, 1824, pp. 286-288, pl. 2) describes as new a species under the name *Scincus bicolor,* from a specimen preserved in the "Philadelphia Museum." The size of the specimen as well as its characters make it certain that it is *laticeps* (head and body 4 inches). The figure is very poor and might equally well represent any of the three species save for size. In the same paper *Scincus erythrocephalus* Gilliams var. is listed. He mentions two dried and faded specimens in the "Philadelphia Museum." These are small specimens, and the description is indeterminate.

Harlan (1829) recognizes three species. These are *Scincus quinquelineatus,* presumably including the young of all three species, *Scincus erythrocephalus* and *Scincus bicolor.* He now gives a locality for the latter—"Inhabits southern states." Harlan (1835) lists a species, *Scincus americanus,* quoting as authority for the name "*S. americanus,* Petiver Gaxophylacii Naturae et Artis 1711 tab. 69, fig. 13." He also places "*S. erythrocephalus* Gilliams" as a synonym. *Scincus quinquelineatus* appears, including *Lacerta fasciatus* as a synonym. He still retains his species *Scincus bicolor* with the comment, "according to Say this is a bleached specimen of Scincus 5-lineata."

Holbrook (1838, vol. II) redescribes and figures a large specimen of *laticeps* as *Scincus erythrocephalus.* The specimen figured is still extant in the Museum of the Academy of Natural Sciences of Philadelphia. The description is an excellent one. The range of the species is given as being from latitude 39 degrees north to Florida along the Atlantic States. He includes Harlan's *Scincus americanus* as a synonym, but does not note Daudin's *tristatus* as a possible synonym. In Vol. III, p. 39, 1839, a species *Scincus quinquelineatus* is described and figured by Holbrook. It is ob-

viously a composite group that is considered, since he includes in the synonymy *Scincus tristatus* Daudin, *laticeps* Schneider, and *Scincus bicolor* Harlan, as well as the *Scincus quinquelineatus* of various authors. However, the specimen figured is the form *inexpectatus*, as is evident by the character of the scales under the tail. This character is mentioned in the text, but he states that this is for one third of the length and posteriorly they are wide, "like subcaudal scales of the boa." The geographic distribution likewise shows that a composite form is considered. This is from latitude 35 degrees north to the Gulf of Mexico. He states that Say observed it on the Missouri river at Engineers Cantonment and that he has received specimens from Louisiana and Mississippi. *Scincus fasciatus* is described in Vol. III, p. 45, and figured on plate 7. The specimen figured is a young seven-lined *laticeps*. In the second edition of his work, issued in 1842, Holbrook again treats of the three forms. *Scincus fasciatus* is a composite including specimens from Pennsylvania south. The figure is of a young specimen of *laticeps*. *Scincus quinquelineatus* is apparently still a composite, the figure, however, being *inexpectatus;* and *Plestiodon erythrocephalus* is an adult male *laticeps*.

In a later paragraph he states: "The geographic distribution of animals would, if it were properly known, go far in determining the identity of the species; thus the *Scincus quinquelineatus* is a southern animal and has never yet been found, as far as I know, north of Virginia, though abundant in the Carolinas, Georgia and the more southern and western states ascending high up in the Valley of the Mississippi [Ohio and Missouri]; while the *Scincus fasciatus* inhabits the Atlantic states from New York to Florida, but has not been found west of the Allegheny Mountains."

Authors subsequent to Holbrook apparently did very little critical work on these forms.

Hallowell (1856) describes as new a skink from Michigan as *Plestiodon vittigerum*, a name that certainly applies to the small, widespread *Eumeces fasciatus*. The type locality is Flint, Mich.

Saeger (1839) had already described a form from Detroit, Mich., as *Scincus lateralis* Say *var*. If one were to refuse to accept Catesby's figure as belonging to this form, Hallowell's name is the first name that unquestionably can be applied to this small, widely distributed species of the five-lined skinks.

In Cope's great work on American herpetology (1900) the three species are united under the name *Eumeces quinquelineatus*. Cope

states: "Professor Baird* has shown that *Scincus erythrocephalus quinquelineatus* and *fasciatus* are forms of the same species, the first name having been given to old males. . . I have adopted his opinion. . ." Cope apparently overlooked the fact that *fasciatus* is the oldest name.

However, Cope names a seven-lined form, *polygrammus*, as a variety of *Eumeces quinquelineatus* from Colonels Island off the coast of Georgia. Unfortunately, this specimen (No. 4156 U.S.N.M.) is no longer extant, and since both *laticeps* and *inexpectatus* may have seven lines, this name is indeterminate (note comments under *inexpectatus*). Two other names have been applied, but these appear to be due to error (Abbot (1868), *Plistodon striatus* and Cope (1871) *Plistodon lineatus*).

From the foregoing account the difficulties of definitely ascertaining the proper name for the three American skinks of this group must seem obvious.

My opinion is that Catesby's figure and description, on which *fasciatus* is primarily based, is an attempt to portray the young of the small five-lined form, here called *fasciatus*, a species which occurs from Florida to Canada, and west to Texas, Oklahoma, Kansas, Nebraska and Dakota. This because of the description given by Catesby, as follows: "This Lizard is usually small, seldom exceeding six inches in length, the head short, the tail is blue, the rest of the body brown; except that from the nose runs five yellow lines at equal distances, along the back to the tail. They are seen often on the ground, and frequent hollow trees. Some people suspect them to be venomous, tho' I never heard of an instance to confirm it. They are found in *Virginia* and *Carolina*." Should one fail to accept this, the name next in order for this form that can be applied with certainty is Hallowell's *E. vittigerum*.

I believe the name *laticeps*, proposed by Schneider, was based on an adult of the large skink of the southern states, since among known species there are none that the description fits more closely than this species. There is great likelihood that the type is the large species from the southern part of the United States, since in the same work he describes other specimens from this region and in the same museum. However, should the type be discovered, and the contrary proved, the next name in order is Daudin's *Eumeces tristatus* (that of Gilliams, *Eumeces erythrocephalus*, chosen by Holbrook, being much later).

* If Baird's opinion has been published, the reference has escaped me.

For the third species I do not believe that any of the earlier names can be applied. Whether *quinquelineatus* was based on this form or one of the other two cannot be ascertained, since it was based on a brief account (whether or not accompanied by a specimen, as Holbrook [1842] states, cannot at this time be determined) written by D. D. Garden, of Charleston, Carolina. The description will fit any one of the three forms at certain stages, since the sublateral lines are the first lost and all may become five-lined lizards and the color of the lines vary from light blue, white, yellow to brown. Holbrook attempted to fix this name for a five-lined form, but without any more positive information as to the type than has been given here. Moreover, there is evidence that his *quinquelineatus* is a composite form. Whether the name *polygrammus** proposed by Cope for a seven-lined form refers to this form or a young *laticeps* cannot be ascertained, since it appears that the type was lost while the collection of the U.S.N.M. was in Cope's hands at Philadelphia or subsequently, since it apparently never reached the U. S. National Museum after the time it was loaned. Unless this type specimen can be found and proved to be of the form with small scutes under the tail, I believe the name *Eumeces inexpectatus*, which I proposed in 1932 for this form, should stand.

Diagnosis. A member of the *Fasciatus* group, with the median light line bifurcating on the nuchal, the branches reuniting on the tip of the snout; a dorsolateral light line, and a lateral line, reaching the tail, the lateral passing through the ear; tail blue in young. Males lose the lined markings and become uniformly colored above, the lateral brown stripe remaining more or less evident throughout life. Seven (more rarely eight) upper labials, the last largest, separated from the auricular opening by a pair of subequal superimposed postlabial scales; the lower secondary temporal usually more or less fan-shaped; scales about body normally 28 or 30 (very rarely 26); postmental divided; a single postnasal. Maximum size, 80 mm.; prefrontals in contact or not; nuchals usually one or two pairs; lamellae under fourth toe usually 16 or 17; intercalated scales on outer side of fourth toe extending no farther than basal phalanx (rarely part way on the adjoining phalanx). Subcaudals very distinctly widened.

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* Cope (1900, p. 637) states: "The *Plestiodon vittigerum* of Hallowell from Michigan belongs to the middle stage of this species, var. *polygrammus*. In a large number of small skinks, etc., etc."

The context seems to show that this statement is in error. I believe it should read: "The *Plestiodon vittigerum* of Hallowell from Michigan belongs to the middle stage of this species."

"Var. *polygrammus:* In a large number of small skinks," etc., etc.

Note further comments on *polygrammus* under *Eumeces inexpectatus*.

Description of the species. A medium-sized species. The rostral high, the part visible above usually less than half the size of the frontonasal; supranasals forming a median suture or not, distinctly smaller than the prefrontals; frontonasal usually broader than long, in contact laterally with the anterior loreal, and in contact or not with the frontal; prefrontals variable in size, if large, forming a median suture, when small, widely separated, occasionally fused with the frontonasal; frontal much broader anteriorly than posteriorly, the anterior tip angular or truncate depending upon the relation of the prefrontals; frontoparietals forming a median suture invariably; interparietal usually elongate, never enclosed by the large parietals; usually two pairs of nuchals, the anterior pair usually larger (but shorter transversely) than the second pair; nasal relatively large, sometimes approaching the size of the internasals, the scale divided by a suture, the anterior portion largest, usually subtriangular; a postnasal almost invariably present; anterior loreal relatively large, distinctly higher than wide, reaching much higher than the posterior loreal; latter longer than high, much higher anteriorly than posteriorly; two presuboculars (very rarely three, in which case the posterior loreal is shortened); there are from seven to nine superciliaries usually, eight being the most frequent number, the anterior one usually larger than the posterior of the series; four supraoculars, three in contact with the frontal.

Primary temporal large, subrectangular, invariably in contact with the lower secondary; latter different in shape, but not especially smaller than the upper secondary, which is relatively short and widened posteriorly; tertiary temporal well-defined, separated from the ear by an elongate scale; four postsuboculars (rarely five), a small preocular, and two small postoculars; upper medial palpebral scales in contact with the superciliaries; lower eyelid with elongate scales separated from the suboculars by two or three rows of granular scales. Upper labials normally seven, four preceding the subocular (more rarely eight, with five preceding the subocular); the first labial a little higher but not larger than the three succeeding; subocular much longer than high; seventh labial much larger than the sixth, the last labial, whether seventh or eighth, always largest; two more or less regularly shaped superimposed postlabials, which enter the ear or are narrowly separated from it by one or two very small granular scales. Mental very large, the labial border greatly exceeding that of the rostral; two postmentals (very rarely except in Oklahoma specimens, where it occurs frequently, there is a

fusion of the two to form a single postmental); three pairs of large chinshields, the anterior pair in contact, each posterior chinshield followed by a large postgenial which is bordered along its anterior, internal border by a relatively large scale longer than wide; usually six lower labials including the last, which is the largest; ear usually surrounded by 18 to 20 scales; three or two small lobules on the anterior border.

Scales on the sides of body parallel, save behind arm insertion; the median dorsal scales not or but slightly larger than adjoining rows; lateral scales as large as or sometimes a little larger than

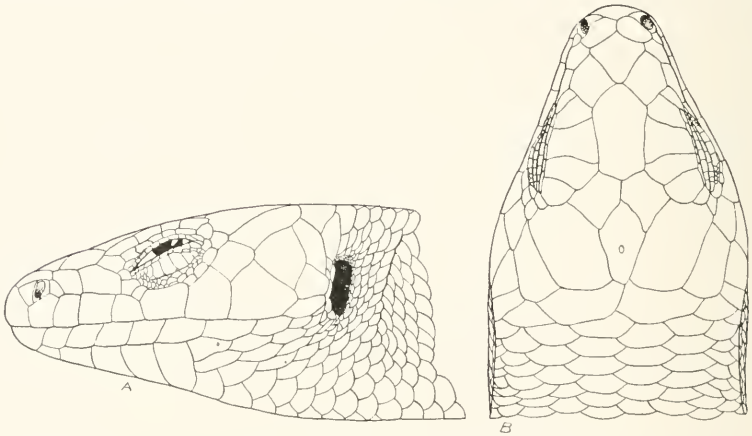

FIG. 25. *Eumeces fasciatus* (Linnaeus). K.U. No. 8332, Lawrence Co., Arkansas. A, lateral view of head; B, dorsal view of head. Actual head length, 11.5 mm.; width, 11.5 mm.

dorsals. Scale rows around head behind ear, 33 to 36; about constricted portion of neck, 29 to 33; about axillary region, 34 to 38; about middle of body, usually 28 or 30 (in Kansas specimens the number 26 occurs in several specimens). Six preanal scales, the median pair much enlarged, the outer scales overlapping the inner; the lateral postanal scale only slightly differentiated in males.

About 15 scales around insertion of arm; outer wrist tubercle well differentiated; numerous enlarged tubercles on the posterior half of the palm; lamellar formula for fingers: 5; 9; 11; 11; 8. Twenty scales about insertion of leg; heel bordered by four enlarged padlike tubercles, the median separated; only one or two enlarged tubercles on the sole. Lamellar formula for toes: 6; 9; 13; 17; 10. Subcaudal scales distinctly widened.

Color (in life). Young, black, with five greenish or bluish-white

lines, the median bifurcating on the nuchal, the branches uniting on the rostral; dorsolateral line beginning on the first superciliary, passing back along the side, following usually the edges of the third and fourth scale rows, although the greater width is on the fourth row; these, with the median, continue about half the length of the tail; the lateral light line begins on rostral, but is usually dim anterior to the fourth labial. Here it widens and continues back to the middle of the front edge of ear (in Arkansas specimens it takes a slightly diagonal trend and may reach nearly to the top of the ear); it then issues from the lower half of ear behind and continues to some distance on the side of the tail; a more or less distinct light line may be evident on the posthumeral and postfemoral regions, the latter more generally present; below the lateral line there is a stripe of black whose lower edge merges into the grayish or bluish-gray of the abdomen; chin, light cream, becoming grayish posteriorly; tail azure.

Adult males have the dorsal color olive-brown, the light lines gray, or light tan, usually indistinctly bordered with darker color; a well-defined brown stripe between the dorsolateral and lateral lines which continues onto the tail; belly somewhat greenish, the head somewhat orange or reddish, at least during the breeding season; bifurcating lines on the head dim. Tail dark gray-olive. Old males lose practically all trace of the light lines, becoming almost uniform olive or brown-olive above; the lateral brown stripe is retained and sometimes the lateral light line. The chin, throat and breast cream; the abdomen gray.

Adult females retain to a considerable degree the color markings

Measurements of *Eumeces fasciatus* (Linnaeus)

Museum	545	2162	7658	732	4990	7674	8769	8774	8765
Number*	T.Z.S.	K.U.	K.U.	K.U.	U.S.N.M.	K.U.	K.U.	K.U.	K.U.
Sex	yg.	yg.	yg.	♂	♀	♂	♀	♂	♂
Snout to vent	25	37	43	54	56	60	64	70	75
Snout to foreleg	11.2	16	16	21	20	24	23	26.3	26
Axilla to groin	12	18	21	25	29	32	37	37	40
Tail	.....	.....	73	.....	.....	108	110	.....	.....
Length of head	6.5	8.2	10	12	12	11	10.8	13.8	14.2
Width of head	5	6	8	10	10	10.8	10	13	13.1
Foreleg	8	11	13	17	16	18	17	19.4	19.2
Hind leg	10.2	14.3	15	24	24.5	26	23	29	29

*Nos. 2162, 732, 7658, 7674, 8769, 8774 and 8765, Lawrence, Kansas; 545, Toledo, Ohio; 4990, Ashville, South Carolina.

of the juveniles save that the dorsal ground color is brownish or brownish-black, the lateral dark stripe differentiated, and the tail loses all traces of the blue color; the lines on the head may become dim and the color of the light lines less intense.

Variation. This species, occupying such a large territory, from Canada to the gulf, westward to Dakota and Texas, might be expected to exhibit very considerable variation. The very surprising fact is that it exhibits less than most species even when one considers a species of very limited distribution.

There is apparently very little difference in size; the largest specimens from Michigan are three or four millimeters longer than those from any other locality, and slightly more robust.

Probably the nearest approach to subspeciation was discerned in certain Oklahoma specimens loaned by Dr. A. I. Ortenburger. In this lot are numerous specimens in which the postmental is undivided, a character occurring very rarely elsewhere in the species. Thus, in a series of thirty Oklahoma specimens from the western part of the range of the species, fifteen have a single postmental. A group of fourteen from this lot is from Seminole county, and of these nine have a single postmental. Throughout other parts of the range this character occurs rarely (about one in a hundred) in the several hundred specimens examined. The preserved material shows no well-defined color markings that would distinguish them from their brothers, save in a living specimen—an adult male (taken in a tree!)—which displayed a very unusual shade of color, the dorsal surface being uniform gray-brown with lavender or purplish iridescence. It appears that these aberrant specimens are on the extreme western edge of the territory occupied by the species, and represent, no doubt, an incipient species. In from 40 percent to 50 percent of the specimens examined, an extra nuchal is present on one or both sides, occurring with about equal frequency in specimens throughout the greater part of the range, but in Kansas specimens the percentage having two nuchals is from 70 to 80.

The usual number of lower labials is seven, the last always largest. Eight upper labials (five preceding the subocular) occur on both sides rarely (approximately four in a hundred), these chiefly through the eastern and southern part of the range. Specimens showing them on one side were of more frequent occurrence.

The character of the temporals and postlabial scales showed a surprising constancy, the two superimposed postlabials being invariably present.

The range of scales from occiput to above anus varies from 53 to 62. Counts available on more than 500 specimens show the prevalence of these counts in order: 30; 39; 60; 135; 129; 90; 24; 1; 1; 1. Thus thirty specimens have a count of 53, 39 of 54, etc. There is some regional variation. Kansas specimens have a much larger percentage with 56, Oklahoma with 58. The range in a single lot from a single locality (Lawrence, Kan.) is 53, 6; 54, 10; 55, 7; 56, 19; 57, 7.

The postnasal is absent in a very few specimens. I have recorded its absence in five specimens, two from Ohio, two from Louisiana and one from Kansas. Two other specimens have the scale absent on one side.

The lamellae under the fourth toe vary typically from 15 to 17, the number 16 being most frequent, the numbers from 14 to 19 occurring the following number of times respectively, in specimens counted: 1, 40, 107, 55, 4, 2.

Superciliaries vary from six to nine: 6, 2 times; 7, 84; 8, 144; 9, 40.

The scale rows about the middle of the body vary from 25 to 32; 25 occurring once (Kansas); 26, 13 times (10 Kansas, three Ohio); 28, 60 times; 29, 17 times; 30, 49 times and 31 once (Indiana), in 141 counts.

Remarks. The well-known habit of this species in brooding its eggs has been mentioned numerous times in the literature, the most extensive account being the recent work of Noble and Mason (1933).

On numerous occasions I have captured specimens with eggs, usually under some flat rock, or under the bark of stumps or fallen logs. They usually appeared loath to leave the clutch.

Dates on which eggs were taken are June 25, 1926 (Devall Bluff, Ark.), two lots (9 eggs in clutch, very slightly incubated); July 2, 1926, clutch of 9 eggs, partly incubated; July 13, 1926, clutch of 10 eggs, the young well formed, the color markings evident. Newly hatched young were first found in Anderson county, Kansas, on July 26. These had apparently just emerged from eggs, as suggested by the condition of the umbilical region.

Eggs taken in June were from one or two millimeters smaller in both transverse and longitudinal diameter than those taken in July.

On numerous occasions specimens have been kept in a vivarium during April, May and June, but I have not observed this form breeding.

Distribution. This species has a greater range than any other known in the genus. Authentic records from South Dakota, the northern peninsula of Michigan, and Ontario, mark the known northern distribution. Unauthenticated reports of the presence of a blue-tailed lizard in Manitoba have reached me, but this must of course be verified. Cope reports a specimen from eastern Nova Scotia which now appears to have been lost. In the Atlantic states the presence of this species has not been verified north of Massachusetts. To the south it extends at least to northern Florida. Along the Gulf of Mexico the species extends to Louisiana and eastern Texas. Burt (1929) believes that a specimen of *obsoletus* reported by Cope from Matamoros is probably *fasciatus*. An examination of this specimen shows it to be unquestionably *Eumeces obsoletus*.

The western limit of distribution appears to be a line approximately following meridian 97 degrees west. Certain records of the presence of this species from more western localities must be discounted. Yarrow (1882) reports three specimens and Cope (1900) three specimens of skinks from Gila River, Arizona (both records refer to U.S.N.M. 9231) the former as *Eumeces fasciatus* and the latter as *guttulatus*. Burt (1929), apparently unaware of Yarrow's identification of the specimens, considers the sole remaining specimen in the U. S. National Museum bearing the number 9231 as a young specimen of *fasciatus*. An examination of this specimen proves it to be *Eumeces callicephalus* or a species extremely closely allied to the latter.

Yarrow (1873) reports a specimen, U.S.N.M. No. 9230, collected by W. S. Wood from Bridger's Pass, Wyo. Cope (1900) reports specimens U.S.N.M. Nos. 3125 (Lieut. Bryant Aug., 1856) and 9230 (W. S. Wood, collector from Bridger's Pass), of *Eumeces quinquelineatus*. Specimens bearing these numbers are no longer present in the collection. However, a specimen of *Eumeces multivirgatus*, U.S.N.M. 9230, from Bridger's Pass (?), Wyo., is present.

In the U. S. National Museum are two specimens listed under No. 3122, as *Eumeces fasciatus* from "Between Guadelupe Mts. and Pecos R., Texas." Cope lists this number under *Eumeces quinquelineatus*, but for a locality, substitutes a (?). These specimens are *fasciatus*, but the locality is certainly incorrect. Two other specimens (U.S.N.M. No. 12193) bear the locality "Santa Fe, N.M.? Newberry." These are typical *fasciatus*. The locality is doubtless incorrect.

In the American Museum of Natural History is a specimen (No.

1596) is *fasciatus*, somewhat atypical, which bears the locality "Western Mexico" (Frank Tondant coll., 1904). It would appear that the locality is incorrect, but of this there may be some doubt; for the present I shall regard it as a *fasciatus* probably originating in some locality in the normal range.

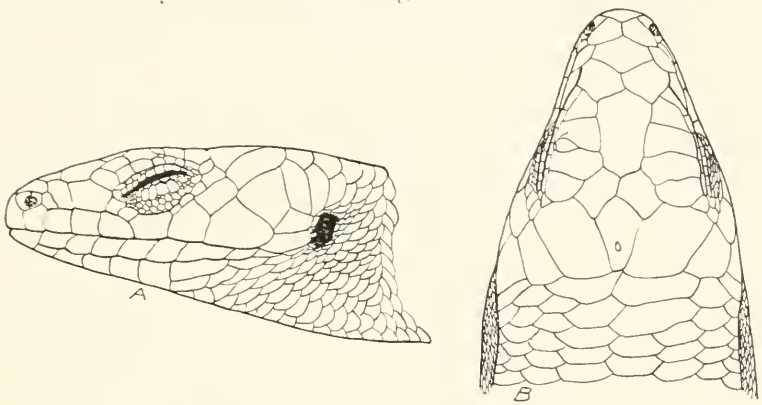

FIG. 26. *Eumeces fasciatus* (Linnaeus). A.M.N.H. No. 1596; "Western Mexico." A, lateral view of head; B, dorsal view of head.

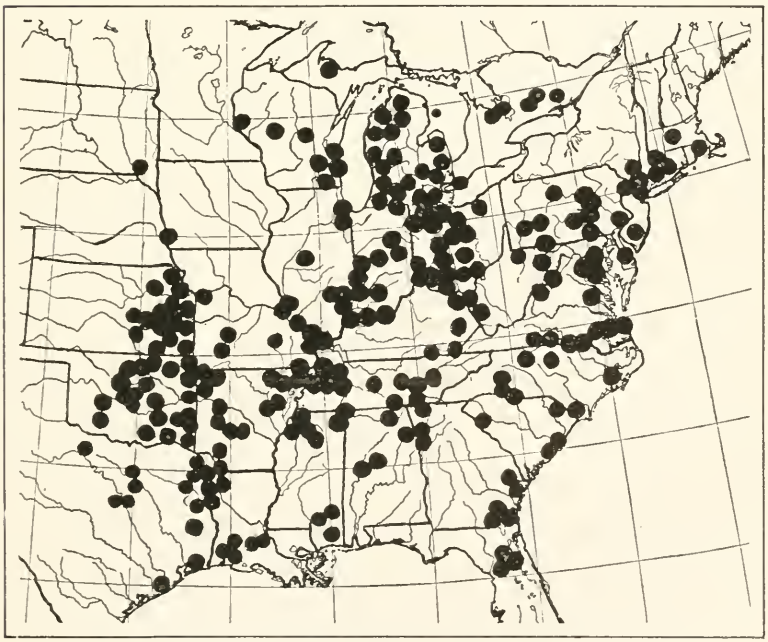

FIG. 27. Distribution of *Eumeces fasciatus* (Linnaeus), in Eastern United States.

LOCALITY RECORDS

MASSACHUSETTS:

Worcester Co.: Barre (Storer, 1840).

Bristol Co.: New Bedford (Allen, 1870).

CONNECTICUT: (Ditmars, 1908).

Litchfield Co.: Salisbury (Linsley, 1843).

Fairfield Co.: Trumbull (Linsley, 1843).

New Haven Co.: New Haven (Henshaw, 1904).

NEW YORK: (A.M.N.H. 1).

Rockland Co.: Ramapo (A.M.N.H. 1).

Orange Co.: Sterling Lake (A.M.N.H. 1); Highland Falls (Mearns, 1898); Bearfoot Mt., Greenwood Lake (Smith, 1899).

Unidentified: Bluffs of the Pallisades (Smith, 1899).

DELAWARE: Choptank Mills (A.N.S.P. 2).

NEW JERSEY:

Passaic Co.: Bluffs of the Passaic at Patterson (Smith, 1899); Greenwood Lake (Myers, 1930).

Atlantic Co.: Two miles above Weymouth (Cornell 1); Hammonton (A.M.N.H. 1); Mays Landing (Stone, 1906).

Bergen Co.: (K.U. 1); Pallisades Park (Meyers, 1930).

?*Sussex Co.:* Lake Hopatcong (Fowler, 1906).

MARYLAND: (A.N.S.P. 1).

Prince Georges Co.: (U.S.N.M. 1).

Charles Co.: Marshall Hall (U.S.N.M. 1).

Anne Arundel Co.: Annapolis (A.M.N.H. 2).

WEST VIRGINIA:

Logan Co.: (T.Z.S. 1).

Grant Co.: Near Dorcas (Carnegie 1).

Marion Co.: Fairmount (Cornell 1).

PENNSYLVANIA:

Clarion Co.: (Surface, 1908).

Huntington Co.: Diamond Valley (A.N.S.P. 4).

Dauphin Co.: (Surface, 1908).

Cumberland Co.: Carlisle (U.S.N.M. 6).

Center Co.: Laurel Valley (Carnegie 1); near Game refuge (Cornell 1).

Clinton Co.: Haneyville (Carnegie 1).

Allegheny Co.: Clairton (Carnegie 1); near Wilkinsburg (Atkinson, 1902).

Westmoreland Co.: ?(Netting, 1930; embryo 34 mm. long. Possibly *laticeps*).

York Co.: York Furnace (Stone, 1906) (may be *laticeps*).

Montour Co.: (Surface, 1908).

Philadelphia Co.: Fairmount Park, Philadelphia (Stone, 1906).

KENTUCKY:

Wayne Co.: Mill Springs (M.C.Z. 1) (Mich. 1) (B.H.F.M. 1) (C.S.N.H. 2).

Breathitt Co.: Quicksand (Cornell 1); Lost Creek (B.H.F.M. 1).

Harlan Co.: Pine Mountain (B.H.F.M. 1).

Carter Co.: (C.S.N.H. 1); Cascade Caves (C.S.N.H. 1).

VIRGINIA: (U.S.N.M. 2); Ferry Landing (U.S.N.M. 2).
Albemarle Co.: Crozet (M.C.Z. 1).
Halifax Co.: Midway (M.C.Z. 1).
Fairfax Co.: Mt. Vernon (M.C.Z. 3) (U.S.N.M. 12); The Dyke (U.S.N.M. 2).
Pittsylvania Co.: Danville (M.C.Z. 2).
Princess Anne Co.: Lynhaven (A.M.N.H. 2).
Norfolk Co.: Lake Drummond, Dismal Swamp (U.S.N.M. 8) (Mich. 2); Jericho Canal, Dismal Swamp (U.S.N.M. 2).
Caroline Co.: Chilesburg (U.S.N.M. 1).
Allegheny Co.: Clifton Forge (U.S.N.M. 2).

DISTRICT OF COLUMBIA: Washington (U.S.N.M. 2).

NORTH CAROLINA: (A.M.N.H. 1).
Wake Co.: Raleigh (Field 1).
Guilford Co.: Guilford (Mich. 3).
Lenoir Co.: Kinston (U.S.N.M. 3).
Craven Co.: Newbern (U.S.N.M. 1); Neuse River, New Bern (Mich. 1).
Catawba Co.: (M.C.Z. 2).
Granville Co.: (M.C.Z. 1).
Vance Co.: Kittrell (M.C.Z. 1).
Cartaret Co.: Beaufort (M.C.Z. 1).
Robeson Co.: Rowland (M.C.Z. 2).
Unidentified localities: Port Hudson (M.C.Z. 2); Lake Tahoma (M.C.Z. 2).

SOUTH CAROLINA:
Anderson Co.: Anderson (A.N.S.P. 1).
Abbeville Co.: Abbeville (A.N.S.P. 1).
Charleston Co.: Charleston (M.C.Z. 1) (A.N.S.P. 7).
Dillon Co.: Little Pee Dee River (A.M.N.H. 1).
York Co.: Rock Hill (Mich. 1).

GEORGIA: (M.C.Z. 2).
Heard Co.: Houston (Mich. 3).
Walker Co.: Chickamagua (Phil. 1).
Liberty Co.: Fulton (M.C.Z. 2).
Charlton Co.: Thompson's lodge, Folkston (Cornell 7).

ALABAMA:
Perry Co.: Uniontown (A.N.S.P. 2).
Calhoun Co.: Anniston (M.C.Z. 1).
Madison Co.: Eutaw (U.S.N.M. 1).

FLORIDA: (A.N.S.P. 2).
Marion Co.: (Mich. 3) (Carnegie 4) (U.S.N.M. 1).
?*Vanderburg Co.:* Perry Township (Mich. 2) (specimen so labeled, possibly Vanderburg Co., Indiana).

MISSISSIPPI: (U.S.N.M. 3) (A.M.N.H. 1).
Perry Co.: New Augusta (U. of Rochester 2).
Lafayette Co.: University (Mich. 4).
Harrison Co.: Biloxi (A.M.N.H. 1).

LOUISIANA: (Field 2, with eggs).
Caddo Co.: (Parish) Gayle (Field 4) (Baylor 26).
West Carrol Co.: (Field 1) (Mich. 1).
Orleans Co.: New Orleans (A.N.S.P. 1) (U.S.N.M. 9).
Jeff Davis Co.: 1 mi. n. Fenton (Mich. 1); Jennings (Cornell 2).
De Soto Co.: Frierson (Baylor 21); near Mansfields (Baylor 5).
St. Landry Co.: Grand Coteau (U.S.N.M. 7).
Plaquemines Co.: (M.C.Z. 2); Belair (M.C.Z. 1) (U.S.N.M. 1).
Bossier Co.: Benton (Baylor 5).

TENNESSEE: (Mich. 2).
Dyer Co.: Maxey (U.S.N.M. 2); Lane (Mich. 1).
Franklin Co.: (U.S.N.M. 7).
Hamilton Co.: Lookout mountain (U.S.N.M. 1).
Reah Co.: Spring City (M.C.Z. 1).
Shelby Co.: Raleigh (A.N.S.P. 1).
Roane Co.: (U.S.N.M. 1).
Carroll Co.: Huntingdon (U.S.N.M. 1).
Williamson Co.: Franklin (U.S.N.M. 1).
Obion Co.: Reelfoot Lake (Mich. 7).
Madison Co.: Jackson (Mich. 1).
Henry Co.: Henry (Mich. 5); near Como (Mich. 1).
Cumberland Co.: Devils Tip Hollow, near Crossville (Mich. 1).
White Co.: Sparta near Bon Air (Mich. 1).
Benton Co.: Camden (Mich. 1).

INDIANA: (M.C.Z. 5).
Wells Co.: (Mich. 1); Bluffton (Mich. 1).
Harrison Co.: Near Palmyra (Mich. 1).
Monroe Co.: 5 mi. east Bloomington (Mich. 1).
Vanderburg Co.: Evansville (Mich. 1).
Jay Co.: Salamonia (Field 1).
Pike Co.: Stendal (Field 1).
Knox Co.: Wheatland (U.S.N.M. 5).
Posey Co.: (M.C.Z. 5).
Vigo Co.: (M.C.Z. 1).
Marion Co.: (M.C.Z. 1).
Putnam Co.: (M.C.Z. 1).
Crawford Co.: (M.C.Z. 2).

ARKANSAS:
Miller Co.: (Baylor 7).
Lafayette Co.: (K.U. 34).
Laurence Co.: Imboden (K.U. 179) (Field 2).
Prairie Co.: Duvall Bluff (K. U. 11).
Washington Co.: (K.U. 8).
Union Co.: (U.S.N.M. 1).
Logan Co.: Blue mountain, Choctaw Route (A.N.S.P. 2); Magazine Mt. (A.N.S.P. 4).
Carrol Co.: Lake Lucerne (Mich. 1).
Benton Co.: 2½ mi. NE Sulphur Springs (Mich. 6); ½ mi. S Sulphur Springs (Mich. 1).

Garland Co.: Hot Springs (Baylor 5).
Saline Co.: (E.H.T. 3).

OHIO:

Adams Co.: Buena Vista (O.S.M. 1).
Franklin Co.: Truro Twp. (O.S.M. 1); Columbus (O.S.M. 1).
Athens Co.: Athens (Ohio U., Athens, Ohio, 1).
Scioto Co.: Brush Creek (Toledo 2); Sunshine (Toledo 1); Roosevelt Game preserve (Toledo 1); Shawnee Forest (O.S.M. 1).
Paulding Co.: Antwerp (O.S.M. 1) (Cincinnati M.N.H. 1).
Hamilton Co.: (O.S.M. 2).
Hardin Co.: 3 mi. east Mt. Victory (Toledo 36); Dudley Twp. (Toledo 3).
Hocking Co.: Good Hope Twp. (Toledo 1) (O.S.M. 1); Clear Creek (O.S.M. 2).
Wood Co.: Ross Twp. (Toledo 1).
Butler Co.: Huestons Woods near Oxford (Toledo 1).
Knox Co.: Mt. Vernon (Oberlin College 1).
Putnam Co.: 3 mi. NW Ottawa (Toledo 1).
Lucas Co.: Toledo (Toledo 1); Richfield Twp. (Toledo 14); Treadway (Toledo 1); Bancroft and County line Road (Toledo 6).
Crawford Co.: 4 mi. NW Sulfur Springs (Toledo 1); 3 mi. N Bucyrus (Toledo 1).
Union Co.: Washington Twp. (Toledo 1).
Highland Co.: Foot Hill (Toledo 1).
Pike Co.: Mifflin Twp. (Toledo 1).
Hancock Co.: Cass Twp. (Toledo 3).
Ashtabula Co.: Pymatuning Swamp (Toledo 1).
Richland Co.: Plymouth Twp. (Toledo 1).

ILLINOIS:

Alexander Co.: Olive Branch (Field 14).
Union Co.: Celto Pass (Field 6).
Pulaski Co.: Grand Chain (Field 1).
Cook Co.: Edgewater (Field 1); Shermerville (Field 1).
Johnson Co.: 20 mi. N. Metropolis (Mich. 1).
Wabash Co.: Mount Carmel (U.S.N.M. 6).
Menard Co.: Athens (M.C.Z. 1).
Jackson Co.: Murphysboro (M.C.Z. 1). Unidentified: Aux Plains, Ill. (U.S.N.M. 1) (possibly not Illinois).

MICHIGAN: (M.C.Z. 1) (A.N.S.P. 5).

Lenawee Co.: (Mich. 1).
Huron Co.: Sand Point (Mich. 16); Rush Lake (Mich. 1).
St. Clair Co.: China Twp. (Mich. 1).
Oakland Co.: Royal Oak Twp. (Mich. 1).
Monroe Co.: (Mich. 7).
Manistee Co.: East Lake (Mich. 1).
Crawford Co.: (Mich. 1).
Ingham Co.: East Lansing (Mich. 1).
Berrien Co.: Warren Dunes (Mich. 2).
Charlevoix Co.: (Ruthven et al., 1928).

Grand Traverse Co.: Traverse City (Mich. 2).
Muskegon Co.: (Field 2).
Marquette Co.: (Mich. 1).
Missaukee Co.: (Mich. 1).
Lake Co.: (Mich. 1).
Kalkaska Co.: (Mich. 2).
Washtenaw Co.: Ann Arbor (M.C.Z. 1). (Also Kalamazoo, Kent, Ottawa, St. Joseph, Van Buren, Mont Calm and Barry counties listed by Gibbs, Notestein and Clark, 1905.)

OKLAHOMA: (A.M.N.H. 1).
Pittsburg Co.: South McAlester (A.N.S.P. 1).
Cleveland Co.: (O.U. 5).
Creek Co.: Sapulpa (A.M.N.H. 1).
Caddo Co.: (O.U. 1).
Rogers Co.: (O.U. 1); Claremore (M.C.Z. 1).
LeFlore Co.: (O.U. 3); Sugarloaf Mt. (A.N.S.P. 3); Wistar (A.N.S.P. 1)
Hughes Co.: (O.U. 2).
Ottawa Co.: Wyandotte (A.N.S.P. 1).
Seminole Co.: (O.U. 14).
Choctaw Co.: (O.U. 1).
Washington Co.: (K.U. 1).
Sequoyah Co.: (O.U. 2).
Latimer Co.: (O.U. 19).
Adair Co.: (O.U. 3).
McCurtain Co.: (O.U. 6); Broken Bow (Field 6).
Logan Co.: (O.U. 5).
Oklahoma Co.: (O.U. 1).
Tulsa Co.: (O.U. 2) (Mich. 6).
Okmulgee Co.: (O.U. 20) (K.U. 3) (Mich. 7).
Payne Co.: (O.U. 3).
Comanche Co.: (O.U. 4).
Atoka Co.: Limestone Gap (A.N.S.P. 4).

KANSAS:
Anderson Co.: (K.U. 43).
Franklin Co.: (K.U. 5) (Mich. 17).
Wilson Co.: (K.U. 2).
Labette Co.: (K.U. 7).
Woodson Co.: (Burt, 1928).
Sumner Co.: (K.U. 2).
Douglas Co.: (K.U. 107) (Field 1) (Cornell 1)
Elk Co.: (Burt, 1928).
Cherokee Co.: (K.U. 7) (A.M.N.H. 1).
Bourbon Co.: (Mich. 6).
Sedgwick Co.: (K.U. 1).
Greenwood Co.: (K.U. 2).
Doniphan Co.: (K.U. 4).
Wyandotte Co.: (K.U. 5).
Montgomery Co.: (K.U. 9).
Allen Co.: (K.U. 16).

Leavenworth Co.: (K.U. 3).
Shawnee Co.: (K.U. 1).
Johnson Co.: (Carnegie 1).
Miami Co.: (Carnegie 1) (Mich. 5).
Riley Co.: (Cragin, 1880).
Geary Co.: (Burt, 1928).
Atchison Co.: (Burt, 1928).
Jefferson Co.: (Burt, 1928).

MISSOURI:
Jefferson Co.: (K.U. 2) (Carnegie 1).
Jackson Co.: (K.U. 4).
Stone Co.: (A.M.N.H. 1); Galena (A.N.S.P. 1); Marble Cave (A.M.N.H. 2).
St. Louis Co.: St. Louis (U.S.N.M. 1).
Christian Co.: Chadwick (A.N.S.P. 1).
Dunklin Co.: (Carnegie 1) (A.M.N.H. 1).
Pemiscot Co.: 10 mi. SE Portageville (Mich. 2); 3 mi. SE Portageville (Mich. 1).
Carter Co.: Big Spring Park (Mich. 7). Unidentified: Shepard, Mo. (Mich. 1).

TEXAS:
Henderson Co.: New York (Baylor 1).
Harrison Co.: Caddo Lake (Baylor 1).
McLennan Co.: (K.U. 1); "McGregor to Conjelle line" (Baylor 1).
Dallas Co.: (K.U. 1); Dallas (A.N.S.P. 3, Boll Coll.); (M.C.Z. 5).
Gregg Co.: (K.U. 1).
Ellis Co.: (K.U. 1).
Baylor Co.: Seymour (A.N.S.P. 1).
Matagorda Co.: Matagorda (A.N.S.P. 1).
Liberty Co.: Liberty (Mich. 2); Dayton (Cornell 1); Cleveland Baylor 1).
Shelby Co.: Joaquin (U.S.N.M. 1).
Tyler Co.: Doncette (Cornell 1).
Marion Co.: Lake Caddo (A.M.N.H. 1).
Bowie Co.: Sulphur River (Baylor 10).

WISCONSIN:
Juneau Co.: New Lisbon (Field 1).
Clark Co.: (Field 1).
Walworth Co.: (Higley, 1889).
Milwaukee Co.: (Pope-Dickinson, 1928).
Washington Co.: (Pope-Dickinson, 1928).
Polk Co.: (Pope-Dickinson, 1928).
Portage Co.: (Pope-Dickinson, 1928).
Waukesha Co.: Golden Lake (Cahn, 1929).

NEBRASKA: ?Fort Pierre (Cope, 1900) (specimen lost).

IOWA: (Somes, 1911).
Woodbury Co.: Sioux City (A.N.S.P. 1) (labeled Dakota, possibly from across the river).

SOUTH DAKOTA: *Clay Co.:* 4 mi. east of Vermillion (Over, 1923).

CANADA

NOVA SCOTIA: St. Catherines (River?) (U.S.N.M. 1, No. 4827).

ONTARIO:

Essex Co.: Point Pelee (N.M.C. 9); Arner (N.M.C. 3).
Peterborough Co.: Peterborough (N.M.C. 2).
Frontenac Co.: Mountain Grove (N.M.C. 1).
Simcoe Co.: Go Home Bay (R. Ontario M. 1); Honey Harbor R. Ontario M. 1).

Eumeces laticeps (Schneider)

(Plates 14, 15; Figs. 28, 29, 30)

NOTE: It has been impossible to determine with certainty that the names allocated here all belong under this species. Moreover, it is quite as probable that certain listed under *Eumeces fasciatus* belong here.

SYNONYMY

1801. *Scincus laticeps* Schneider. Hist. Amph., II, 1801, pp. 189-190 (type description; no type locality; type originally in Museum of Göttingen, Germany); Daudin, Hist. Nat. Rept., IV, 1803, p. 301 (redescription, after Schneider); Merrem, Tent. Syst. Amph., 1821, p. 72.

1801. *Lacerta tristata* Latreille. Hist. Nat. Rept., I, p. 248 (not seen).

1802-'03. *Scincus tristatus* Daudin. Hist. Nat. Rept., IV, p. 296 (part.) (description based partly on a manuscript description and partly on specimens presumably from Carolina).

1803. *Scincus quinquelineatus* Daudin. Hist. Nat. Rept., IV, 1803, p. 272 (part.); Harlan, Journ. Acad. Nat. Sci. Phila., VI, pt. 1, 1829, pp. 10-11 (part.); and Med. Phys. Res., 1835, pp. 138 and 161 (part.); Holbrook, N. Amer. Herp., III, 1839, pp. 39, 40; and 2d Ed., II, 1842, pp. 121-125.

1818. *Scincus erythrocephalus* Gilliams. Journ. Acad. Nat. Sci. Phila., I, 1818, p. 461, pl. XVIII (type description; type locality, "Southern States"); Harlan, Journ. Acad. Nat. Sci. Phila., VI, pt. 1, 1829, p. 11 (southern states); and Phys. Med. Res., 1835, pp. 138, 139; Holbrook, N. Amer. Herp., 1st Ed., II, 1838, pp. 101-103, pl. XXII (plate drawn from A.N.S.P. No. 9298); Cuvier, Reg. Anim., 1829, p. 62; Griffith, Cuvier's Anim. King., IX, 1831, p. 157.

1824. *Scincus bicolor* Harlan. Jour. Acad. Nat. Sci. Phila., IV, pt. 2, 1824, p. 286, pl. XVIII, fig. 1 (type description; type locality, "Southern States"); and Journ. Acad. Nat. Sci. Phila., VI, pt. 1, 1829, pp. 11-12, and 37; and Med. Phys. Res., 1835, p. 139; Cuvier, Reg. Anim., 2d Ed., II, 1829, p. 62; Griffith, Cuvier's Anim. King., IX, 1831, p. 157.

1830. *Euprepes tristatus* Wagler. Syst. Amph., 1830, p. 62.

1831. *Tiliqua erythrocephala* Gray. In Griffith's Cuvier's Anim. Kingd., IX, Syn., 1831, pp. 69-70; Mag. Nat. Hist. Jardine, I, p. 292.

1831. *Tiliqua quinquelineata* Gray. In Griffith's Cuvier's Anim. King., IX, Syn., 1831, pp. 69, 70 (part.).

1831. *Tiliqua bicolor* Gray. In Griffith's Cuvier's Anim. King., IX, 1831, p. 70.

1835. *Scincus americanus* Harlan. Med. Phys. Res., 1835, pp. 138, 139 (name apparently based on Petiver's [Gazoph. Nat. et artis, 1711] tab. 69, fig. 13 [not seen]).

1839. *Plestiodon laticeps* Duméril and Bibron. Erp. Gén., V, 1839, pp. 705-706; Gray, Cat. Spec. Liz. Coll. Brit. Mus., 1845, pp. 90-91; ?Jan, Cenni. Mus. Civ. Milan Ind. Sist. Rett. Anf., Milan, 1857, p. 6 (Georgia); Baird, Expl. and Surv. R. R. Route Pac. Ocean, 1859, pp. 25-27 (specimen mentioned now U.S.N.M. 9239); ?Theobald, Cat. Rept. Mus. Asiat. Soc. Bengal, (No. CXLVI), Ext. number Journ. Asiat. Soc. Bengal, 1866, p. 26.

1839. *Plestiodon quinquelineatum* Duméril and Bibron. Erp. Gén., V, 1839, pp. 707-709 (part.); Wright and Funkhouser, Proc. Acad. Nat. Sci. Phila., 1915, pp. 133-136 (Okefinokee Swamp. [part.] This lot contains *laticeps*, *inexpectatus* and a form having 24 scale rows. This specimen has been beheaded and cannot be properly identified).

1839. *Scincus fasciatus* Holbrook. N. Amer. Herp., 1st Ed., 1839, III, p. 45, pl. 7; and *idem*, 2d Ed., 1842, II, pp. 127-129, pl. 18 (the figure is *laticeps*).

1838. *Tiliqua erythrocephala* Gray. Cat. Slend.-Tongued Saur., Mag. Nat. Hist., II, 1838-'39, p. 292.

1842. *Plestiodon erythrocephalus* Holbrook. N. Amer. Herp., 2d Ed., 1842, pp. 117-120, pl. XVI; DeKay, Zoöl. N. Y., Rept. Amph., 1842, p. 30.

1864. *Eumeces laticeps* Peters. Monatsb. Konigl. Akad. Wiss. Berl., 1864, p. 49; Bocourt, Miss. Sci. Mex., Liv. 6, 1879, pl. XXII, D, figs. 6, 6a, 6b; Taylor, Univ. Kan. Sci. Bull., XX, No. 13, May 15, 1932 (issued Oct. 1, 1932), pp. 251-261 (comparison with *E. inexpectatus*); ibid, No. 14, May 15, 1932 (issued Oct. 1, 1932), pp. 263-271, pls. XIX and XX; Dury and Williams, Baker-Hunt Found. Mus., Bull. I, Nov., 1933, p. 14 (Kentucky records).

1879. *Eumeces quinquelineatus* Bocourt. Miss. Sci. Mex., Liv. 6, 1879, pp. 426-428 (part.); Smith, Rep. Geol. Surv. Ohio, V, pt. 1, 1882, pp. 650, 651 (part.); Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 269 (part.); Rhodes, Proc. Acad. Nat. Sci. Phila., 1895, pp. 386, 387 (part.); McLain, Contr. N. Amer. Herp., 1899, pp. 1-5 (part.); Stone, Proc. Acad. Nat. Sci. Phila., 1903, p. 538 (part.) (Spec. from Petit Jean Mt. Ark. A.N.S.P. 15452); Stone, The Amer. Nat., XL, Mar., 1906, p. 168 (York Furnace, York Co., Pa.); Strecker, Proc. Biol. Soc. Wash., XXI, July 27, 1908, p. 169 (part.); Hurter, Trans. Acad. Sci. St. Louis, XX, 1911, pp. 140-142 (part.) (Missouri); Ditmars, The Reptile Book, 1915, pp. 196, 197 (part.), and pp. 201-203 (part.).

1882. *Eumeces fasciatus* Yarrow. Bull. U. S. National Museum, No. 24, 1882, pp. 41, 42 (part.); Blatchley, Rep. State Geol., 1891 (1892), pp. 548, 549 (part.); Stejneger and Barbour, Check List N. Amer. Amph. and Rept., 2d Ed., 1923, p. 75 (part.); Blanchard, Papers. Mich. Acad. Sci. Arts Lett., IV, 1924, pp. 535, 536 (part.) (Nos. 58737 and 58738); Strecker, Contr. Baylor U. Mus., No. 5, May 15, 1926, pp. 5, 6 (part.) (Louisiana); and *idem*, No. 7, 1926, p. 7 (part.); Ortenberger, Uni. Okla. Bull., Proc. Okla. Acad. Sci., VI, pt. 1, 1926, p. 95 (part.); Brimley, Journ. Elisha Mitchell Sci. Soc., XLII, 1926, p. 83 (Key; part.); Ortenberger, Copeia, No. 170, 1929, p. 11 (part.), and p. 27 (part.); Conant, Bull. Antiv. Inst. Amer., IV, No. 3, Dec., 1930, p. 63 (part.).

1917. *Plestiodon fasciatus* Stejneger and Barbour. Check List N. Amer. Amph. Rept., 1917, p. 69; Blanchard, Occ. Papers Mus. Zoöl. U. of Mich., No. 117, 1922, p. 7 (part.; 2 specimens from Henry, Tenn.); Strecker, Baylor U. Bull., XXVII, No. 3, pt. 3, 1924, pp. 37, 38 (part.) (Arkansas).

History. In a short paper published in 1932 I revived the name *Eumeces laticeps* for the large, lined skink occurring in the southeastern part of the United States, a name first assigned by Schneider (1801) to a broad-headed skink in the Museum of Göttingen. This brief description points out certain salient features of the adult male, but omits pertinent details of squamation. It likewise mentions the fact that formerly the specimen had black spots near the end of the tail, a character normally present in no skink known today. One presumes that, if present, these marks may have been due to injury or some accident of preservation (such as a fungus growth when a preserving fluid has become very weak). Unfortunately the origin of the specimen was either not known or not recorded by Schneider. The second specimen mentioned by Schneider, known to him only by a drawing, is obviously not of this species. Inquiry regarding the type has to date met with no reply. I regard it likely that it is still extant.

Under *Eumeces fasciatus* I have traced the history of this form, and believe it unnecessary to repeat it here (consult pages 188-198).

Diagnosis. A large species of the *Fasciatus* group, characterized by the presence of five or seven white lines in the young, the median bifurcating on the nuchal, and the branches running forward to the frontonasal; tail blue in young; limbs long, overlapping; prefrontals broadly in contact; one postnasal; two postmentals; subcaudal scales greatly widened; scale rows 30-32; usually eight supralabials, five preceding the subocular, which is relatively high; primary temporal relatively small, touching the lower secondary, which is frequently enclosed by the tertiary temporal and the last labial; latter relatively low and much elongated; the intercalated plates on the outer side of fourth toe extend to or nearly to ultimate phalanx.

Description of the species. Portion of rostral visible above often approaching the size of the frontonasal; supranasal moderate, longer than wide, forming a median suture; frontonasal relatively small, almost invariably separated from the frontal; prefrontals large, almost invariably in contact, much larger than the frontoparietals; frontal usually constant in shape, broadly angular anteriorly, posteriorly the sides sloping gradually, in contact with three supraoculars; frontoparietals relatively small, forming a suture usually equal to a half or more of their length; interparietal relatively short and wide, usually truncate posteriorly; one, rarely two, pairs of nuchals, not as strongly differentiated as and relatively smaller than in most species.

Nasal moderately large, divided by a suture, the anterior part largest; a small postnasal; anterior loreal higher than wide, higher than posterior; latter large, much longer than high; two presuboculars, the anterior usually much the larger; four supraoculars; superciliaries eight to ten; five (or four) postsuboculars; primary temporal subquadrangular, in contact with the lower secondary temporal, which is triangular if enclosed by the seventh labial and the elongate tertiary, or the lower part may be elongated by fusion with a scale segmented from the tertiary temporal and as a result reaches the edge of the ear; upper secondary temporal usually more than twice the area of the primary, much widened posteriorly. Usually eight labials (rarely seven), five preceding the subocular, which is as high or higher than length of its labial edge; first labial a little higher than but rarely as large as the third or fourth; eighth labial much elongated along labial border, separated from the ear by (normally) one small postlabial, very rarely by two superimposed, in which case the upper is usually a segment

of the tertiary temporal; anterior ear lobules inconspicuous, usually thickened and flattened, lying close to the surface; upper palpebral scales, with the exception of one or two (or in one case none), separated by a row of granules from the superciliaries; lower lid with four or five enlarged plates separated from the subocular by usually four, rarely three or five, rows of granules; mental moderate, with a labial border much larger than that of rostral; two postmentals, the anterior small; three pairs of chinshields, first only in contact; last followed by an elongated postgular, which is bordered on its anterior inner edge by a scale longer than wide; six lower labials, the last largest.

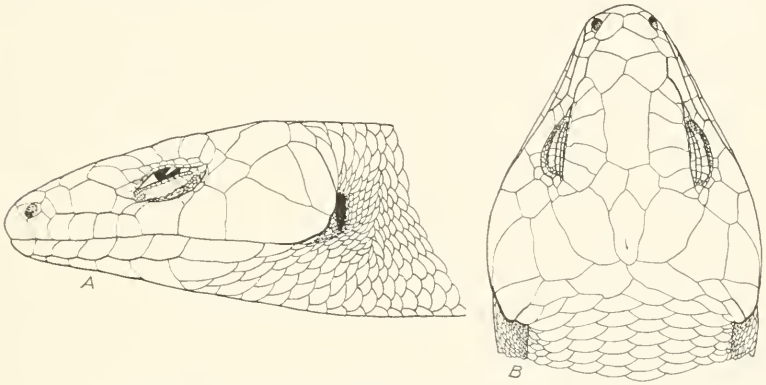

FIG. 28. *Eumeces laticeps* (Schneider). Field Mus. No. 853, Enterprise, Florida. A, lateral view of head; B, dorsal view of head. Actual head length, about 25 mm.; width, about 26 mm.

Scales on body, save in postaxillary region, parallel; no (or very slight) differences in size of the scales about the middle of body. There are 24 to 26 scales around the ear. Scales in a row about neck behind ear 35 to 42, the higher counts most frequent; about constricted portion of neck 33 to 36, thirty-four being most frequent; about body in axillary region 38 to 45 rows; about middle of body 30 to 32 occurring with about equal frequency (very rarely a little higher or lower). Widened subcaudals vary from 100 to 106. Six scales border the anterior edge of vent, the median pair distinctly enlarged, the outer scales overlapping inner; lateral postanal scute usually somewhat enlarged and differentiated in males; about twenty scales about arm insertion; outer wrist plate or tubercle strongly enlarged; sole with a group of various-sized, enlarged, padlike tubercles; lamellar formula of fingers: 6; 10; 12; 14; 8. Twenty-four scales about insertion of leg; heel usually bordered by

four padlike scales not in contact medially; usually three padlike tubercles on sole posteriorly; the outer scales of sole strongly imbricated, flat, the inner scales small, granular or tubercular; intercalated scales on outer side of fourth toe extending the length of the two basal phalanges, and all or part of third. Lamellar formula for toes: 8; 11; 14; 19; 14.

Head in young and females normal; in old and adult males it becomes greatly widened behind the ear; in old males the width of the head exceeds considerably the length.

Color. Young, deep black above, with a tail deep blue, slightly ultramarine below. A median greenish or (bluish posteriorly) light line bifurcating anteriorly on the nuchals, the branches reuniting on the frontonasal or supranasals; the line extends about one third the length of the tail. The dorsolateral line begins on the first superciliary, passes back along the sides of the body and continues from one third to one half the length of the tail, occupying the middle part of the fourth scale row the greater part of its length; a lateral line begins on the presuboculars, curves under the eye, and rises to top of ear; it emerges about middle of posterior edge of the ear, continues back on the basal half of the tail, wider on sides of neck, following the middle of the seventh scale row the greater part of its length; sublateral light line begins on back edge of lower jaw, runs to shoulder where it is interrupted, then follows back along the tenth row or edges of the ninth and tenth to the hind leg, where it is interrupted; it is discernible a short distance on the tail. This line is less intense than the others. Occasionally, whitish spots on the forearm and a postfemoral light line, sometimes reaching the foot; dorsal lamellae of the toes with lighter areas; first four labials light, the lower part of the posterior labials dark; chin, cream; belly, bluish-gray. The dorsal lines are usually greenish-white anteriorly, but posteriorly they may be light blue or blue-white; underside of limbs grayish-white; more rarely they appear cream or light tan.

Young adults have the ground color lighter, some of the darker pigment remaining, usually forming dark lines along the median and dorsolateral light lines. The dark area between the dorsolateral and lateral light lines remains dark but usually changes to a dark brown, more or less uniform, but occasionally flecked with olive.

From this time on the color of the males tends to diverge from the juvenile character, the stripes losing their distinctness and the dorsal color becoming more or less uniform brown or olive, or even olive flecked with darker color. The lateral brown stripe is usually more

Measurements of *Eumeces laticeps* (Schneider)

Museum Number* Sex	U.S.N.M. 56907 yg.	U.S.N.M. 36783 yg.	U.S.N.M. 58240 yg.	U.S.N.M. 58262	U.S.N.M. 84018	U.S.N.M. 58251	K.U. 7808 ♀	U.S.N.M. 58261	K.U. 7807 ♂
Snout to vent	30	36	40.5	52.4	59	79	95	105	110
Tail	40	.....*	60	71	93	124	141	153	reg.
Snout to eye	3	3.2	4	4.8	5.3	6.2	7.4	9	11
Snout to ear	8	8.2	10	12	13.4	17.5	20	21	29
Snout to foreleg	13	13.4	16.5	19.3	22.8	29	34	41	42
Axilla to groin	14	19	21	27	31	41	54	53	57
Width of head	5.3	6.1	8	9	10	14.8	18	20	26.6
Length of head	7.8	7.7	9.1	10.6	12	15.5	18	20.2	24
Width of body	5.2	6	8.6	11	12	18	23	21	25
Foreleg	10.2	11	12	16	18.8	23	28	30	33
Hind leg	13	14	17	22.4	27	33	40	41	45
Longest toe	5.1	6.2	7	7	10	13	14	15	15.5

* No. 84018 Edgefield Co., S. C.; 36783 Augusta Co., Va.; 56907 Jefferson Co., Mo.; 58240 Oregon Co., Mo.; 58251 Butler Co., Mo.; 58262 Nassau Co., Fla.; 58261 Southern Florida; K.U. 7807 and 7808 Imboden, Ark.

or less distinctly retained, and the lateral light line continues to be more or less discernible. The head becomes red.

The females tend to retain more of the details of juvenile coloration, and the light stripes are discernible in the largest specimens examined. They, however, become tan or a different shade of olive; the ground color becomes lighter and usually is olive, flecked with black. The lateral stripe is very distinct.

Variation. In my study of this species I have examined 278 specimens, 20 states and more than 117 localities being represented. In a species having so large a distribution, it was surprising that no well-established variation in squamation was discerned. True, in certain localities it is possible to demonstrate certain average differences. Thus, a larger percentage of specimens in the southeastern

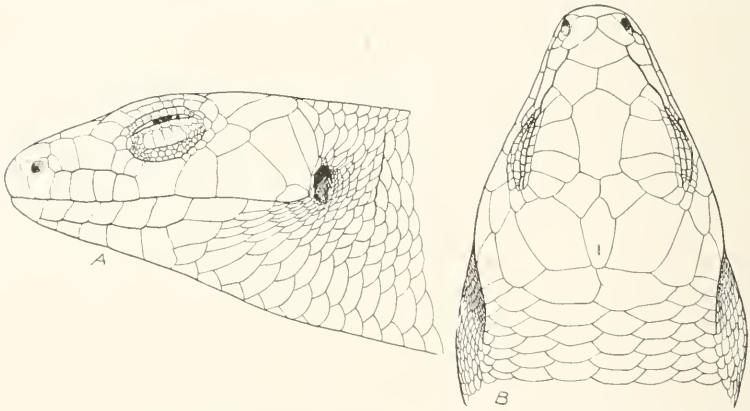

FIG. 29. *Eumeces laticeps* (Schneider). K.U. No. 7809; Imboden, Lawrence Co., Arkansas. Female. A, lateral view of head; B, dorsal view of head. Actual head length, 17 mm.; width, 18 mm.

part of the range have the lower secondary temporal enclosed posteriorly by the tertiary temporal and the seventh labial; however, numerous examples show a different arrangement; in the specimens from the more western parts the above arrangement occurs much less frequently. In a previous paper (Taylor, 1932) I regarded that this difference, together with the absence of the sublateral line, might warrant the separation of the eastern from the western form. After an examination of the series mentioned I have concluded that this is, at least at the present, not warranted.

The following data on occurrence of this character were taken in 103 specimens from numerous localities: Florida, 8 with lower secondary temporal enclosed, one not enclosed; Georgia 7, 4; Ala-

bama 2, 0; South Carolina 7, 2; Virginia 3, 2; Ohio 0, 4; Maryland 0, 1; West Virginia 1, 0; Mississippi 0, 1; Indiana 1, 5; Illinois 0, 2; Oklahoma 2, 19; Arkansas 0, 14; Louisiana 0, 2; Tennessee 0, 8; Kentucky 0, 1; Texas 0, 2; Missouri 0, 4.

The sublateral line is lacking in all younger specimens in the territory west of the Appalachian Mountains, but whether this is invariably true cannot be ascertained in all specimens, due to the fact that this character is obliterated in adult males.

The number of scales from the parietals to above vent varies from 54 to 60, the numbers 57 and 58 occurring with practically equal frequency, each nearly three times as frequently as 59 or 56. Specimens having 54 and 55 are from northern Arkansas. The higher numbers are also present in the same lot from the same locality. The widened subcaudal scales from anus to tip of tail vary between 93 and 100, usually 96 or 97. The extra pair of nuchals is present in about four cases; however, a single extra nuchal on one side or the other is about twice as frequent in occurrence. The frontal is separated from the frontonasal in about 95 per cent of the specimens; a single postmental occurs in about two percent of the specimens.

The number of superciliaries in 180 counts (90 specimens) vary from seven to eleven, occurring in the following order of frequency: 7, 2; 8, 58; 9, 80; 10, 36; and 11, 4 times. Eight is of more frequent occurrence in western specimens. Subdigital lamellae under the fourth toe vary between 16 and 20; in 104 specimens 16 occurring 39 times; 17, 94; 18, 62; 19, 12; and 20, once. There is no regional difference apparent. The postsuboculars vary from four to six. In 159 specimens four occurs on one or both sides 79 times; 5, 159 times; 6, 3 times.

The number of scale rows about the middle of the body varies from 28 to 34, which represents a range more or less typical of certain other species of the genus. The numbers from 28 to 34 occurred with the following frequency in 136 specimens where counts were made: 1, 1, 56, 13, 53, 5, 7. Thus, 30 rows, occurring 56 times, are but slightly more numerous than 32 rows, occurring 53 times. The 5 specimens with 33, and 7 with 34, are not confined to any particular region, but are from widely scattered localities.

Remarks. The separation of this species from the two related species, *fasciatus* and *inexpectatus,* is not difficult if one takes the time to compare the specimens with the descriptions here given. In

the recent edition of the Check List N. Amer. Amph. Reptiles, by Stejneger and Barbour, 3d Ed., 1933, p. 80, the following footnote occurs: "Two additional species of Eumeces, viz. *E. inexpectatus* and *E. laticeps*, have been recently recognized by E. H. Taylor (Univ. Kansas Science Bull., Vol. 22, No. 13, 1932, p. 251, and Univ. Kansas Science Bull., Vol. 22, No. 13, 1932, p. 263). The evidence thus far adduced does not support the validity of these forms."

Since the above statement has been published I have discussed the question with both Doctor Stejneger and Doctor Barbour, supplying still further evidence for the recognition of the forms. For so long a time Cope's conclusions (1900) in regard to this group have held sway that it is difficult to realize that a different interpretation is tenable, inasmuch as Cope's keen discernment rarely overlooked forms worthy of taxonomic distinction. Even with the desire to recognize the three forms, and trying to verify their status, the herpetologist is still doubtful that it is warranted when, on examining a jar of specimens, all of which come from the same locality (not impossibly collected on the same date and by a single collector), he finds three specimens which have the characters of the three proposed forms. The conclusion based on experience is that he is dealing with a variable form and the characters are unworthy of even subspecific recognition. Another jar examined may show specimens which exhibit characters of only two species. I say it seems more reasonable to suppose that one is dealing with a variable form, rather than with three separate species, since it is rare in one's experience to find three species occupying the same general range, having enough characters in common to cause a herpetologist to mistake them as one, and having at the same time distinguishing features, perhaps less obvious, that would warrant their being regarded as totally distinct species.

However, I believe, unquestionably, that this is exactly the state of affairs with regard to the forms *fasciatus, laticeps* and *inexpectatus*. I likewise believe that anyone who has access to sufficient material and who will examine the material with sufficient care to note all characters, cannot fail to be convinced of the separate identity of these forms.

Distribution. The species occupies in general the entire southeastern part of the United States, extending north to the southern parts of Pennsylvania, Ohio, Indiana and Missouri, and as far west as eastern Oklahoma and Texas.

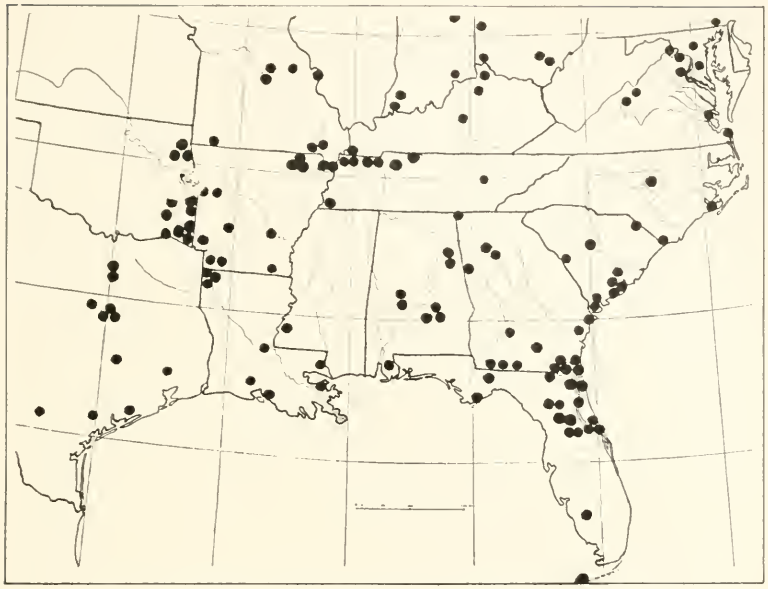

FIG. 30. Distribution of *Eumeces laticeps* (Schneider), in Eastern United States.

LOCALITY RECORDS

PENNSYLVANIA: *Lancaster Co.:* York Furnace (A.N.S.P. 1).

MARYLAND: Camp Roosevelt (U.S.N.M. 1).

WEST VIRGINIA: *Jefferson Co.:* ½ mi. above Harper's Ferry (U.S.N.M. 1).

VIRGINIA: (A.N.S.P. 1).
Loudoun Co.: (A.N.S.P. 1).
Princess Anne Co.: Virginia Beach (U.S.N.M. 1).
Prince William Co.: Manassas (U.S.N.M. 1).
Agusta Co.: O'Connell's Place (U.S.N.M. 1).
Gloucester Co.: (U.S.N.M. 1).
Rockbridge Co.: Natural Bridge (U.S.N.M. 1).

NORTH CAROLINA:
Cartaret Co.: Beaufort (M.C.Z. 1).
Columbus Co.: Lake Waccamaw (U.S.N.M. 1).
Wake Co.: Raleigh (Baylor 1).

SOUTH CAROLINA:
Edgefield Co.: 1 mi. NW Trenton (U.S.N.M. 1).
Beaufort Co.: Hiltonhead (A.N.S.P. 1); Port Royal (M.C.Z. 1).
Anderson Co.: Anderson (A.N.S.P. 1) (U.S.N.M. 1).
Dillon Co.: Little Pee Dee River (A.M.N.H. 2).
Charleston Co.: Charleston (M.C.Z. 1; Holbrook's specimens) (Field 1) (U.S.N.M. 1); Mount Pleasant, Christ Church Parish (U.S.N.M. 4).
Berkeley Co.: St. Stephen (Toledo Zoöl. Soc. 1); Oakley (U.S.N.M. 1).
Richland Co.: Columbus (U.S.N.M. 1).

GEORGIA: (A.N.S.P. 1) (Cornell 1).

Cobb Co.: Roswell (M.C.Z. 3).

Dade Co.: Sand Mt. Trenton (A.M.N.H. 1).

Grady Co.: Beachton (Field 2).

Thomas Co.: Thomasville (A.N.S.P. 3).

Turner Co.: Ashburn (A.M.N.H. 2).

Lowndes Co.: Valdosta (A.M.N.H. 2); Melrose (Mich. 1); "a little north of Valdosta" (M.C.Z. 1).

Charlton Co.: Cypress Bayou, Okefinokee Swamp (A.M.N.H. 1); Okefinokee (Cornell 18); East of Folkston (Cornell 1); St. Petersbourg (Cornell 1).

Heard Co.: Houston (Mich. 2).

Camden Co.: St. Mary's (M.C.Z. 2) (U.S.N.M. 1).

Chatham Co.: Savannah (M.C.Z. 2).

Fulton Co.: (M.C.Z. 4).

Liberty Co.: Riceboro (U.S.N.M. 3).

Berrien Co.: Nashville (U.S.N.M. 2).

ALABAMA: (A.N.S.P. 1) (U.S.N.M. 1); "Northern Alabama" (U.S.N.M. 1).

Perry Co.: Uniontown (A.N.S.P. 1).

Butler Co.: Pigeon River (A.N.S.P. 2).

Calhoun Co.: Anniston (M.C.Z. 2).

Montgomery Co.: Montgomery (U.S.N.M. 1); Barachias (U.S.N.M. 1).

Baldwin Co.: Perdido Bay (U.S.N.M. 1).

MISSISSIPPI: (U.S.N.M. 3).

Adams Co.: (A.N.S.P. 1).

TENNESSEE:

Shelby Co.: Raleigh (A.N.S.P. 2).

?Obion Co.: Reelfoot Lake, Samburg (A.N.S.P. 3).

Henry Co.: Henry (Mich. 2).

Houston Co.: Danville (U.S.N.M. 1).

Knox Co.: Knoxville (U.S.N.M. 1).

Montgomery Co.: Clarksville (U.S.N.M. 1).

FLORIDA: (A.N.S.P. 1) (U.S.N.M. 1).

Volusia Co.: Volusia (A.N.S.P. 1); Enterprise? (Field 1); DeLand (U.S.N.M. 1) (Field 1) (Cornell 3).

Marion Co.: (Field 1) (Cornell 3); Eureka (A.M.N.H. 1).

Duval Co.: Near Jacksonville (A.M.N.H. 4); Arlington (M.C.Z. 1) (U. S. N. M. 2).

Alachua Co.: Near Gainesville (A.M.N.H. 1); Alachua (Mich. 1); Gainesville (Mich. 2); Micanopy Road (Mich. 1).

Lake Co.: (Mich. 1).

Leon Co.: Tallahassee (Mich. 1).

Franklin Co.: Apalachicola (U.S.N.M. 1).

Nassau Co.: (U.S.N.M. 1).

Columbia Co.: Blounts Ferry (U.S.N.M. 1).

Monroe Co.: Indian Key (U.S.N.M. 1).

Lee Co.: (U.S.N.M. 1).

Unidentified localities as regards counties: Indian River, Fla. (U.S.N.M. 1); Camp Baracca (M.C.Z. 1); St. John's River, Beecher Pt. (U.S.N.M. 1).

LOUISIANA: (A.N.S.P. 1).
Orleans Parish (or county): Gentilly (Ottawa Uni. 1).
St. Mary's Co.: Morgan City (U.S.N.M. 2).
Caddo Co.: Gayle (Field 1) (Baylor 2); Frierson (Baylor 1).
St. Landry Co.: Grand Coteau (U.S.N.M. 1).
St. Tammany Co.: Covington (U.S.N.M. 1).
Iberia Co.: Avery Island (C.A.S. 1).

TEXAS:
Bexar Co.: (Baylor 1).
Dallas Co.: Dallas (A.N.S.P. 1) (M.C.Z. 2) (Cornell 1).
Washington Co.: Clifton Bosque? (Cornell 1).
Matagorda Co.: Matagorda (Cornell 3).
Victoria Co.: Black Bayou (Cornell 6).
McLennan Co.: Asa (Baylor 7); Waco (Baylor 1).
Bosque Co.: (Baylor 3).
Liberty Co.: Cleveland (Baylor 2).
Unidentified for county: Brazos River (U.S.N.M. 1, Shumard Coll.).

OKLAHOMA:
McCurtain Co.: (O.U. 4).
Delaware Co.: (O.U. 6).
Choctaw Co.: (O.U. 2).
Pushmataha Co.: (O.U. 1).
Leflore Co.: (O.U. 3) (Cornell 4).
Latimer Co.: (O.U. 5).
Unidentified: Old Fort Cobb (U.S.N.M. 1).

ARKANSAS:
Logan Co.: Petit Jean Mt. (or Yell Co.) (A.N.S.P. 1).
Lawrence Co.: Imboden (K.U. 5) (Field 2).
Sevier Co.: Lakesburg (A.M.N.H. 2).
Jefferson Co.: New Gascony (A.N.S.P. 2).
Sebastian Co.: Fort Smith (U.S.N.M. 1, Shumard; Orig. No. 3176).
Garland Co.: Hot Springs (U.S.N.M. 1) (Baylor 1).
Ashley Co.: Wilmot (U.S.N.M. 1).
Miller Co.: (Baylor 2).

OHIO:
Hocking Co.: Good Hope Twp. (Toledo Zoöl. Soc. 1); Clear Creek (Ohio State Mus. 1).
Darke Co.: Greenville (Cornell 1).
Athens Co.: Athens (Ohio U. 1).
Hamilton Co.: Cincinnati (Baylor 1).

INDIANA:
Pike Co.: Stendel (Field 1).
Jefferson Co.: Madison (M.C.Z. 2); Hanover (A.N.S.P. 1) (Mich. 1).
Wells Co.: Bluffton (Mich. 1).
Vanderberg Co.: Evansville, 7 mi. SW (Mich. 1).

ILLINOIS: Southern Ill. (U.S.N.M. 1).
Randolph Co.: Chester (Mich. 1).
Monroe Co.: Red Bud (Mich. 1).
Jackson Co.: Murphysboro (Mich. 1).

Alexander Co.: Olive Branch (Field 2).
St. Clair Co.: Belleville (U.S.N.M. 1).
Wabash Co.: Mt. Carmel (U.S.N.M. 1).

MISSOURI:

Pemiscot Co.: (Mich. 1).
Butler Co.: (U.S.N.M. 2).
Stone Co.: (A.M.N.H. 1) (Cornell 1).
St. Louis Co.: St. Louis (U.S.N.M. 4).
Cooper Co.: Boonville (M.C.Z. 1).
Montgomery Co.: ?Bigspring Park (Mich. 1).

KENTUCKY: (M.C.Z. 2).

Fulton Co.: Hickman (U.S.N.M. 2).
Kenton Co.: (B.H.F.M. 1); Independence (B.H.F.M. 1).
Grant Co.: Crittenden (C.S.N.H. 3).

Eumeces inexpectatus Taylor

(Plate 16; Figs. 31, 32)

SYNONYMY*

1839. *Plestiodon quinquelineatus* Holbrook. North Amer. Herp., III, 1839, pp. 39-41 (part.), pl. VI (the plate is a picture of a specimen of this species); and 2d Ed., II, 1842, pp. 121-124 (part.), pl. XVII.
1879. *Eumeces quinquelineatus* Bocourt. Miss. Sci. Mex., Liv. VI, 1879, pp. 426-428; Liv. VII, 1881, pl. 22E, figs. 10, 10a, 10b and 10c (part.).
1932. *Eumeces inexpectatus* Taylor. Uni. Kans. Sci. Bull., XX, No. 13, Oct. 1, 1932 (Bull. Uni. Kansas, Vol. XXXIII, No. 10, 1932), pp. 251-261, pl. XVII, figs. 1-5 (type description; type locality Citrus Co., Fla.).

History. This species, apparently common over the southeastern part of the United States, has long been identified under the name *Eumeces quinquelineatus* and *Eumeces fasciatus.* Whether or not this form was actually described by Linnaeus cannot absolutely be proved or disproved. Since *fasciatus* should be used for the widespread species, I am of the opinion that neither name can be applied to this form. The brief description of *quinquelineatus* given by Linnaeus is so inadequate that it applies equally well to all three of the species occurring in the type locality—*fasciatus, laticeps* and *inexpectatus.* As the types of the Linnaean species are, so far as can be ascertained, lost, it is obvious that there can never be an absolutely certain fixation of the name *quinquelineatus.*

The only attempt to fix the name *quinquelineatus* to any one of the three species is that of Holbrook (1838 and 1842), who applies the name to this species at least in part, and gives a figure of a specimen of this species. It is obvious that this is an arbitrary choice. Moreover, from the data given in the discussion and the distribution, it is apparent that it is in a measure a composite

* It is certain that many of the references listed under *laticeps* and *fasciatus* refer, at least in part, to this species.

form. Some of Holbrook's specimens in the Academy of Natural Sciences, Philadelphia, with this name, are *Eumeces laticeps*.

When I discerned that three distinct species occurred, the question arose as to whether the Linnaean name *quinquelineatus* or some later name might apply to this third form. After considerable research in the literature (see discussion under *fasciatus*), it seemed that none of these could be applied with any degree of certainty, and a new name, *inexpectatus*, was erected.

At that time I had available only 36 specimens. To date I have been able to study 226 specimens, all of which agree, with that chosen as the type, in all essential details. These additional specimens have added but little to our knowledge of distribution, save that the southern Virginia records take it a little farther north than was known, and those from Louisiana a little farther to the southwest. Numerous specimens have since been examined from Alabama and Georgia, as well as from those states where its presence was definitely known previously. (Consult the history of *Eumeces fasciatus* in this work for a more detailed account of the earlier names than is given here.)

Diagnosis. A member of the *Fasciatus* group, with characters somewhat intermediate between *Eumeces laticeps* and *E. fasciatus*. Young with median light line from head to tail, bifurcating on the nuchal, disappearing in adult males; a distinct dorsolateral line usually, but not invariably, remaining evident in adult males; a broad lateral brown stripe, bordered by a light lateral line, usually not continuous on the labials; young with (usually) a sublateral light line. Upper labials seven or eight, last largest, separated from the ear by an elongate lower postlabial, with two smaller postlabials above it; usually one pair of nuchals; one postnasal; two postmentals; median preanal scales relatively small; 30-32 scale rows about the middle of the body; subcaudal scales not distinctly enlarged. Young with a blue tail.

Description of type (Kansas University Museum, No. 8232, Citrus Co., Fla.). The portion of the rostral visible above a little less than half the bulk of the frontoparietal; supranasal large, forming a relatively short median suture, touching postnasal and anterior loreal laterally; frontonasal much broader than long, touching the anterior loreal laterally; the sutures with the supranasals somewhat shorter than those with prefrontals; latter large, broadly in contact medially, forming subequal sutures with the first supraocular and first superciliary; frontal about one fourth longer than

its distance from the end of the snout, distinctly wider anteriorly than posteriorly, the sides gradually sloping, in contact with three supraoculars; frontoparietals moderate in size, forming a suture half their length; parietals very broad, not enclosing the interparietal; a pair of large nuchals; nasal divided, the posterior part forming a narrow rim about nostril; a relatively large postnasal; two loreals, the anterior very little higher than the posterior, which is elongated; two presuboculars; four-five postsuboculars; primary temporal quadrangular, nearly square; upper secondary temporal elongate, widened but little posteriorly; lower secondary temporal

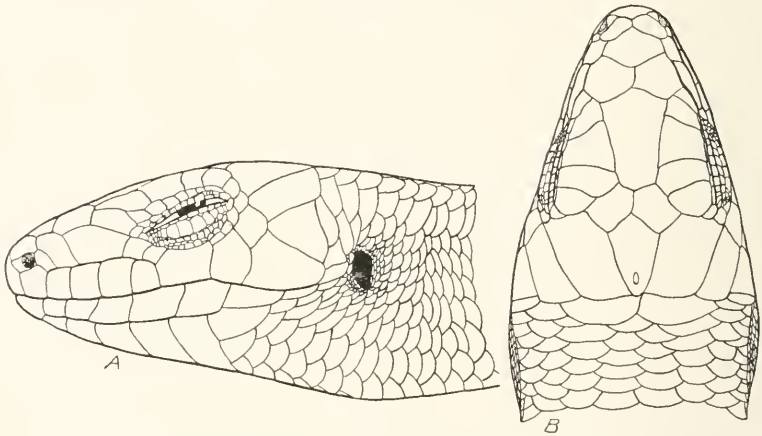

FIG. 31. *Eumeces incxpectatus* Taylor. K.U. No. 8232 (type); Citrus Co., Florida. A, lateral view of head; B, dorsal view of head. Actual head length, 13.2 mm.; width, 12 mm.

nearly triangular, the longest side next to the labial; an elongate tertiary temporal following behind the secondaries; nine superciliaries, the first and last largest.

A small preocular; two small postoculars; large opaque plates on lower eyelid separated from subocular by four rows of tubercles; only the four median upper palpebral scales form sutures with the superciliaries; eight upper labials, first with posterior part much elevated above the succeeding four which precede the subocular; seventh distinctly smaller than eighth, which is the largest of the series; this followed by an elongate curved postlabial which enters ear, with two small scales in contact with it above (on left side the posterior is small); three small free lobules on anterior border of ear; six lower labials; mental with much greater labial extent than rostral; two postmentals; chinshields typical, the last followed by

two scales, the outer large, elongate, the inner small, variable, a little longer than wide; 37 scales about neck behind ear; 31 rows about narrow part of neck; 40 rows about body in axillary region; 32 scale rows about middle of body; 21 rows about base of tail; lateral scales parallel save in axillary region, a little larger than dorsals; six or eight preanals, the median only moderately enlarged, outer scales overlapping inner; subcaudal scales not or but slightly differentiated in shape or width from the other caudal scales; scales about insertion of arm, 15; a well-defined, large, wrist tubercle; 12 to 15 enlarged padlike tubercles on palm; lamellar formula for fingers: 6; 10; 13; 13; 8. About 20 scales around insertion of hind limb; heel bordered by four or five contiguous plates, with only one or two somewhat enlarged tubercles anterior to the four heel plates. Lamellar formula for toes: 7; 11; 13; 18; 11. Intercalated scales on fourth toe not reaching beyond the basal phalanx.

Head slightly bulging behind eye; ear opening moderate; limbs well developed, the hind leg reaching elbow of adpressed forelimb. The pits on the scales are very small, punctate, occurring on sides of neck and body, on posthumeral and postfemoral regions and sides of tail. In the neck region scales may have as many as 15 pits (much more numerous and smaller than in *fasciatus*). In older specimens these become obsolete, as they are in the type. However in certain of the paratypes they are quite distinct.

Color (in alcohol). Above generally bronze, the scales showing certain metallic reflections; many scales showing a somewhat darker area; the top of head somewhat yellowish-brown; a median lighter line, whitish or yellowish, dimly visible, bifurcating on the nuchal, the line still visible to the prefrontals; a dorsolateral light line extending from supraoculars far onto the side of the tail; the line following outer edge of fourth and inner third of the fifth row of scales, bordered above by a fine row of small black dots. A broad, brown stripe on side of head, somewhat deeper brown than on top of head, growing gradually darker on neck, and becoming almost black along side of body and tail; a lateral light line beginning on the presuboculars, forming at first a series of four more or less disconnected white spots, the last reaching top of ear; it emerges from lower half of ear and continues above hind limb on the side of the tail, very strongly defined its entire length; lateral light line bordered below by a dark stripe; no sublateral light line visible at this age; chin and lower labials flesh colored; venter grayish, growing bluish-gray posteriorly; a light line on the posterior side of

femur; toes and feet lighter than venter, the scales darker edged on toes.

Color of female (paratype): Above very dark brown, with the median light line bifurcating on nuchals, continuing to rostral, bordered by deep black lines; bronzy anteriorly, blue-black posteriorly; dorsolateral line narrow, running through middle of fifth scale row, greenish-white with metallic reflections, bluish posteriorly; lateral stripe intensely black on sides, brownish on head; lateral line prominent, wider anteriorly; otherwise similar to male.

Measurements of *Eumeces inexpectatus* Taylor

Museum Number	K.U. 8232	K.U. 8233	Mich. 61632	Mich. 61634	Mich. 61754
Snout to vent	66	62	79	73	77
Snout to foreleg	26	22	29	28	26
Snout to ear	15	14	17	17.3	17.1
Tail	reg.	reg.	128*	181*	115*
Width of head	12	10	15	13.6	13
Length of head	13.2	11.4	15.2	15	14.7
Axilla to groin	36	30	38	37	41
Postanal tail width	9	7.5	9	10	9
Foreleg	20	19	24	21.5	22
Hind leg	28	25	33	31	31.5

* Partly regenerated. 8232, type; 8233, paratype; 61632, Michigan U. Mus., Hillsboro, Fla.; 61634, near Gulfport, Pinelas Co., Fla.; 61754, Cabbage Key, Fla.

Variation. Detailed scale counts were made on 90 specimens, while data on certain scales were recorded in a larger number. The following variation is evident: Scales in a line from parietals to above anus, 55-59, the number 55 occurring 6 times; 56, 12 times; 57, 39 times; 58, 23 times; and 59, 10 times. The variation has no geographical significance. The scale rows about the middle of the body vary from 29 to 36; they are normally 30, 31, or 32. In 108 counts, 30 occurs 24 times; 31, 24 times; and 32, 47 times. Two specimens have 29, one 33; ten have 34, and one has 36. These specimens with very high numbers are from various localities. The specimen having 36 scale rows is from Little Sarasota Bay, Florida (U.S.N.M. 9953). The labials are either seven or eight; in 106 counts, the number 7-7 occurs 46 times; 8-8 occurs 35 times; and the number 7-8 occurs 25 times. The postmental is invariable.

In 125 specimens, 103 have the prefrontals in contact; 22 have them separated, but usually the separation is very small. In one

ease they are separated by a small intercalated scale. The nuchals were observed in 92 specimens. The arrangement 1-1 (one pair) occurs in 61 specimens; 1-2 in 22 specimens; 2-2 (two pairs) in 7 specimens; and 3-2, in two. The number of lamellae under the fourth toe was counted 188 times (94 specimens). The number 14 occurs once; 15, five times; 16, 37 times; 17, 88 times; 18, 37 times; 19, 10 times; and 20, twice.

Superciliaries vary from 7 to 10, seven occurring 10 times; 8, 66 times; 9, 83 times; and 10, seven times, in 84 specimens. The number of postsuboculars varies from three to five. The numbers 3-3 occur three times; 4-3, three times; 4-4, 69 times; 4-5, seven times; 5-5, ten times.

The limbs, when adpressed, invariably overlap; in old males the average is about 12 millimeters. The scales separating the last labial from the ear and the lower secondary temporal show some variation; occasionally there is only a single scale above the elongate postlabial; more frequently two.

Color variations seem to be those dependent on age or sex. Here, as in related species of the *fasciatus* group, the adult males undergo a complete or nearly complete color evolution from the brilliant lined young with azure tails to dull-colored, brownish-olive specimens with orange or reddish head in old age. The brown lateral stripe appears to remain very distinct in the old. The females retain in much greater degree the juvenile pattern.

Coloration of young (from University Michigan Museum, No. 61629; from near Gulfport, Pinelas Co., Fla.). General ground color deep black; a very narrow median greenish-white line running to nuchals, where it is slightly separated from the two diverging lines of the head; posteriorly, on back, median line light blue or bluish-white, becoming a deeper blue on tail, and finally lost in the blue ground color of the latter part of the tail; dorsolateral line, not touching diverging lines of head, arises separately on the first superciliary, continues with irregular edges over outer side of the supraoculars, then continues along side of body to tail, following the fifth scale row, generally greenish-white, but becoming blue posteriorly; first four labials the creamy color of the chin and lower labials; lateral white line arises on the second loreal, passing through the presuboculars and under eye, crossing the last two labials to the top of ear, where it stops; the line then begins behind ear about middle and continues back to tail; lower part of the posterior labials dark; between the median and dorsolateral lines are two

dim, narrow, bronze-colored lines on the edges of the second and third scale rows, visible as far as the tail, where they become blue; belly bluish-gray, which color reaches on side to the black stripe which is below the lateral line, at which the gray is slightly lighter so as to suggest a dim sublateral white line; tail deep blue, darker posteriorly, the underside of tail a more grayish-blue. Chin and breast cream color; a whitish line on posterior surface of hind leg.

A second young specimen, an immature male (48 mm.) (University of Michigan, No. 61631, from Hillsboro Co., Fla.), already begins to show the brownish coloration on the side of the head and the labial line shows the tendency to form white spots on the brown color of the posterior labials; the throat shows a slight salmon-brown suffusion. In general, the markings are the same as in the preceding specimen. The bifurcating lines usually do not actually contact the median line on the nuchals, but tend to turn out slightly at this point.

Remarks. While, as pointed out, this form bears much similarity to *fasciatus,* it should in no sense be construed as a subspecies of either *fasciatus* or *laticeps,* since the fact that it occurs through so wide a territory occupied by these two species and maintains its identity, precludes such an association. The maximum size of this species is 89 millimeters snout to vent; I have found four males reaching 85, and a single one reaching to 89 millimeters in the 236 specimens examined. It is slightly larger than *fasciatus,* but much smaller than *laticeps.* The tails are rarely complete. A specimen, 27 mm. snout to vent, has a tail 44 mm.; one 50 mm., a tail 100 mm.; one 53 mm., a tail 95 mm.; one 79, a tail 125 mm. The subcaudal scutes in two complete tails were 110 and 112.

Unfortunately, I have no data on the habits of this form, nor can I state whether it is terrestrial or arboreal. The claws are somewhat more of the general character of *laticeps,* and distinctly larger than in *fasciatus.* The character of the subcaudals serves to separate the species most easily. In tails that have been completely regenerated this is impossible, since in the regenerated part the scales are strongly widened.

Like all of the known species of *Eumeces,* variation in head scales as well as scale rows and details of the markings must be anticipated, at least to the extent to which they occur in any other species of *Eumeces,* closely related or not. Many of the variations in the material examined have been pointed out; other variations occur.

Cope (1900, p. 637) states: "The *Plestiodon vittigerum* of Hallowell from Michigan belongs to the middle stage of this species, var. *polygrammus*." As this seems unreasonable I suspect a typographical error, and that the latter part should read: "of this species.

Var. *polygrammus*," etc.

There follows comments on a specimen from Colonels Island which differs from *quinquelineatus*, "in having the five bluish-white lines on a black ground very narrow; the legs uniform black without any stripe. There is a third lateral stripe on each side, between the fore and hind legs, less distinct than the other, and a short, light stripe on each side of the median one on the back of the neck. This is along the adjacent edges of the first and second row of scales from the median line, the inner edge of this first row involved in the median stripe. The posterior extremity of the oval light outline on the head above, instead of being connected with the end of the dorsal stripe as its bifurcation, has the two branches curved outward, as a quarter circle, and connecting with the two supplementary short cervical stripes and not at all with the median."

Practically every character listed is characteristic of both *inexpectatus* and *laticeps*, except the statement that there is no stripe on the leg, since a white stripe on the posterior part of femur occurs in both species. In regard to the median line, I find that the "bifurcating" lines of the head usually do not contact the median line. However, in some specimens they do (*vide* Taylor 1932, pl. XVII, fig. 2.) and in none I have examined do they agree with the description as I understand it. Certain specimens of *laticeps* sometimes fail to have the median dorsal line touch the head lines. The lines between the dorsolateral line and the median line develop in both species, perhaps earlier in *inexpectatus*.

Since the type of this species is apparently lost it seems impossible to do more than hazard a guess as to the identity of *polygrammus*, although to me it seems more likely that it is the form called *inexpectatus* than *laticeps*. However, were I to use the name *polygrammus* instead of *inexpectatus*, it is obvious that I would be exchanging a certainty for an uncertainty, and in that case one might just as well use the name *quinquelineatus*, another uncertainty and an older one!

Moreover, there is of course a possibility that this is the form described as *capito* by Bocourt.* I have not allocated this name to

* *Eumeces capito* Bocourt, Miss. Sci. Mexique, Liv. VI, 1879, pp. 429-431, pl. XXII D, figs. 8, 8a, 8b, 8c.

synonymy, but think it probable that it is based upon an aberrant specimen of *fasciatus*.

Distribution. The northern limits of distribution of this form are as yet uncertain. It follows the Atlantic and Gulf Coast line from Norfolk, Va., to the Mississippi river mouth. Whether it reaches any considerable distance from the coast in the seaboard states is known only as obtains in Mississippi, where a series of specimens have been collected at University in Lafayette Co., approximately 250 miles from the coast. In South Carolina it is known to reach York Co., about 150 miles from the coast. Indiana records in the Museum of Comparative Zoölogy, Harvard College, must be regarded as too doubtful to be considered. A very considerable part, if not the entire range of this species, is shared with *laticeps*, and, with the possible exception of southern Florida, also with *fasciatus*.

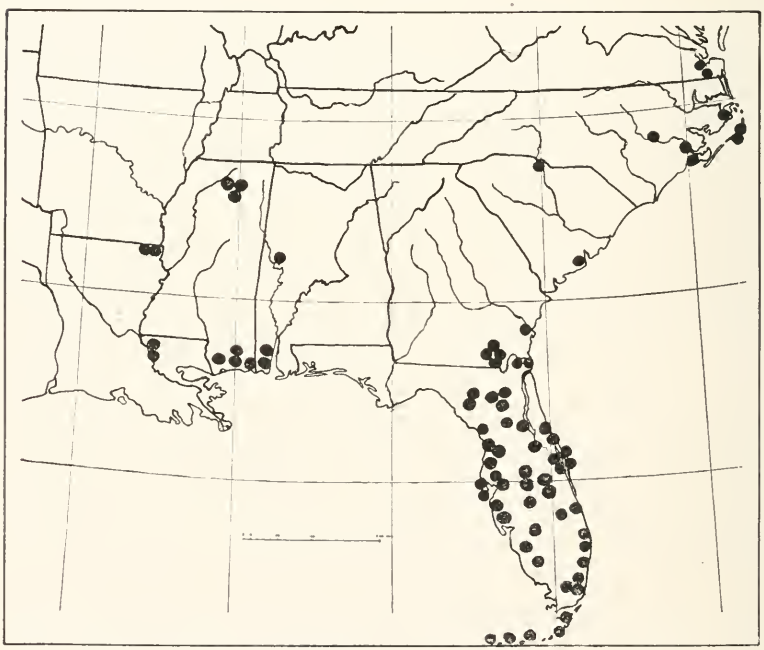

FIG. 32. Distribution of *Eumeces inexpectatus* Taylor, in Southeastern United States.

LOCALITY RECORDS

VIRGINIA: *Norfolk Co.:* Norfolk (U.S.N.M. 1); Wallaceton, Dismal Swamp (U.S.N.M. 1).

NORTH CAROLINA:

Craven Co.: Newbern (Mich. U. 1) (U.S.N.M. 1).

Lenoir Co.: Kinston (U.S.N.M. 1).

Dare Co.: Hatteras, Hatteras Is. (U.S.N.M. 2).

Cartaret Co.: Beaufort schute (M.C.Z. 2, part of Nos. 3405-3407).

SOUTH CAROLINA:

Charleston Co.: Charleston (M.C.Z. 1) (Field 1) (U.S.N.M. 1) (A.N.S.P. 4).

York Co.: Near Rockhill (Mich. U. 1).

FLORIDA:

Alachua Co.: (Mich. U. 1); Gainesville (Mich. U. 2).

Brevard Co.: Eau Gallic (M.C.Z. 2); Georgiana (U.S.N.M. 16); Canaveral (A.M.N.H. 5); Micco (A.M.N.H. 1).

Citrus Co.: (K.U. 2, types); Pineola (A.M.N.H. 1).

Dade Co.: (U.S.N.M. 1); Everglade (A.M.N.H. 1); Homestead (M.C.Z. 1); Long Pine Key (M.C.Z. 1); Miami (M.C.Z. 3); Lemon City (U.S.N.M. 1).

Hillsboro Co.: (K.U. 5) (Mich. U. 2).

Lake Co.: (U.S.N.M. 1); St. John's River, Hawkinsville (M.C.Z. 1); Tavares (U.S.N.M. 2); Lakeland (A.M.N.H. 5).

Lee Co.: (U.S.N.M. 1); Fort Meyers (Mich. U. 1); Captive Is. (A.M.N.H. 1).

Manatee Co.: Little Sarasota Bay (U.S.N.M. 3).

Marion Co.: (Field 2) (Carnegie 2); Eureka (Toledo Z.S. 1).

Monroe Co.: Key West (M.C.Z. 1) (U.S.N.M. 1); Tortugas (M.C.Z. 2); Pine Key (M.C.Z. 1); Paradise Key (M.C.Z. 3); (?) Boca Chica Key (M.C.Z. 1).

Nassau Co.: (U.S.N.M. 1).

Orange Co.: Chuluota (U.S.N.M. 1).

Osceola Co.: Kissimmee (M.C.Z. 1); Lake Kissimmee (U.S.N.M. 1); (?) Kissimmee Prairie (A.M.N.H. 3).

Palm Beach Co.: West Palm Beach (M.C.Z. 1); Ritta (U.S.N.M. 3); Lake Worth (U.S.N.M. 1); Hobe Sound (A.M.N.H. 2).

Pasco Co.: Argo (A.N.S.P. 3).

Pinclas Co.: Long Key (Mich. U. 2); near Clearwater (Mich. U. 1); near Gulfport (Mich. U. 2); St. Petersburg (Cornell 3).

Polk Co.: Lake Kissimmee (U.S.N.M. 1); Auburndale (U.S.N.M. 6).

St. Lucie Co.: Sebastian (M.C.Z. 2).

Volusia Co.: Volusia (A.N.S.P. 8); New Smyrna (U.S.N.M. 1).

Indeterminate localities—as regards county: Lake Okechobe (M.C.Z. 1); East Florida (M.C.Z. 1); Florida (M.C.Z. 6) (A.M.N.H. 2) (Carnegie 1); Cabbage Key (Mich. U. 1); St. John's River (U.S.M.N. 1); South Fla. (U.S.N.M. 1); Arcadia Is. (U.S.N.M. 1); Central Fla. (U.S.N.M. 1); Royal Palm Hammock (U.S.N.M. 1); Oak Lodge (A.M.N.H. 5).

GEORGIA: (M.C.Z. 1).

Liberty Co.: Riceboro (U.S.N.M. 1).

Charlton Co.: Cypress Bayou, Floyds Is., Okefenoke Swamp (A.M.N.H. 2); Okefenoke Swamp (Cornell 10).

ALABAMA:

Lee Co: (U.S.N.M. 1).

Mobile Co.: Whistler (U.S.N.M. 2); Mobile (M.C.Z. 1); 10 miles west of Mobile (M.C.Z. 1).

Greene Co.: Eutau (U.S.N.M. 1).

MISSISSIPPI:

Lafayette Co.: University (Mich. U. 6).

Hancock Co.: Bay St. Louis (Mich. U. 3) (U. S. N. M. 1).

Harrison Co.: Biloxi (Field 1) (U.S.N.M. 3).

Jackson Co.: Ocean Springs (Cornell 1).

LOUISIANA:

East Baton Rouge Co.: Camp Wilson, Indianmound (Field 10; one number, 4831, with five young *fasciatus*).

East Carrol Co.: Mellville (U.S.N.M. 3).

?INDIANA: (Several specimens in M.C.Z. from the Blatchley Collection bear the following records: *Putnam Co.*, Ind. (M.C.Z. 2); *Knox Co.*, Ind. (M.C.Z. 1); *Crawford Co.*, Ind. (M.C.Z. 1); Indiana (M.C.Z. 3). I am strongly inclined to regard these localities as doubtful until further material is discovered in this state.)

Eumeces tunganus Stejneger

(Fig. 35, Distribution)

SYNONYMY

1896. *Eumeces Xanthi* Günther. Ann. Mus. Zoöl. St. Petersbourg, I, 1896, p. 203 (non Günther, 1889).

1924. *Eumeces tunganus* Stejneger. Journ. Washington Acad. Sci., XIV, No. 16, Oct. 4, 1924, pp. 383, 384 (type description; type locality, Tung River Valley near Luting Kiao, western Szechwan); and Proc. U. S. Nat. Mus., LXVI, Art. 25, 1926, pp. 51, 52; Gee, Bull. Dept. Biol. Yenching U., I, 1929-'30, p. 63.

History. The types of this species were discovered August 9, 1923, by the Rev. D. C. Graham in the Tung River valley near Luting Kiao in western Szechwan. Doctor Stejneger (1924) pointed out that the Russian explorer Potanin had obtained specimens in August, 1894, at Li-Fangfu (also in the Tung River valley), which Günther (1896) identified as *Eumeces xanthi* Günther. Doctor Stejneger had these specimens compared with drawings of the type of *tunganus* by Mr. S. Czarewsky, who pronounced them identical with the species from which the drawing was made.

The type specimen is injured by a great gash across the shoulders, and the preservative (apparently formalin) has discolored the specimen and perhaps obscured certain color markings. The smaller paratype is in good condition, but is likewise discolored.

A second series of eleven specimens was later sent to the U. S. National Museum. These are U.S.N.M. Nos. 81976-81978, and 82750-82757, collected by Reverend Graham at Lu Ding Chiao, Szechwan, China, altitude 5,000 ft., July, 1930.

Diagnosis. A typical five-lined species with the median light line bifurcating at the nuchal and later reuniting on the snout; a patch of irregular, enlarged scales on the posterior surface of the thigh; a keeled, lateral postanal scale is absent. A postnasal present; two postmentals; limbs overlapping when adpressed; 28 scale rows about the body; 64 scales from parietals to above the anus. The upper secondary temporal large, the posterior border greatly elongate, notched below by the small, nearly parallel-sided lower secondary temporal.

Description of the species (from the type, U.S.N.M. No. 66736, Luting Kiao, western Szechwan, "Where the road to Tatsienlu crosses the Tung River;" alt., 5-6,000 ft.; collector, Rev. D. C. Graham, Aug. 9, 1923). Snout relatively slender, the part of rostral visible above pointed, the area much less than the frontonasal; supranasals large, forming a median suture; frontonasal six-sided, relatively narrow due to height of the anterior loreals which border it laterally, not or scarcely larger than the prefrontals; latter pentagonal, forming a median suture, and sutures with the frontal, frontonasal, second loreal, first loreal, first supraocular, first superciliary and each other, the length of the sutures in the order named; frontal elongate, obtusely angular at each end, its length a little greater than its distance from the end of the snout, bordered by three (two on left side) supraoculars, broadly separated from the frontonasal; frontoparietals larger than the prefrontals, their median suture greater than half their length; interparietal rather small, elongate, not enclosed by the parietals; parietals angular, distinctly longer than wide; two pairs of nuchals; four supraoculars; nasal small, divided by a suture, the lower suture reaching the first labial; a postnasal slightly wedged between first and second labials; anterior loreal much higher than wide, much higher than posterior, which is very much longer than high; two presuboculars; eight superciliaries, the anterior large, elongate, the last relatively very small compared with the typical condition in the genus; four postsuboculars; primary temporal rectangular; upper secondary very large, the posterior part curved, greatly elongated, the lower side notched by the small, nearly parallel-sided lower secondary temporal; tertiary temporal rather short and wide, separated from the

nuchal by another scale longer but less wide; first pair of postlabials large, the upper scale the larger; the second pair small; two or three tiny serrate auricular lobules; seven upper labials, last largest, widely separated from the upper secondary temporal, the four anterior not greatly differing in height, all lower than the subocular; five or six lower labials; two azygous postmentals (abnormally divided in the type so that the second part is separated from the labials); three pairs of chinshields, the first in contact; the postgenial large, bordered on anterior inner border by a slender elongate scale; mental with a much larger labial border than rostral.

Eye small, its length much less than its distance from the nostril; most of the upper palpebral series contact the superciliaries; lower eyelid with three enlarged scutes separated from the subocular labial by two granular rows of scales; a tiny preocular; two small postoculars; ear surrounded by about twenty or twenty-one scales.

The median dorsal scale rows widened anteriorly, not or only slightly widened in the middle of back; scales around neck behind ear, 40; about narrow part of neck, 34 rows; 38 rows in axillary region; 26 about middle of body; 21 about base of tail; space of three subcaudals occupied by four or five series of small scales following anus; subcaudals distinctly widened, about four times as wide as long; tail regenerated posteriorly; eight preanal scales, the two median greatly enlarged, the outer scales overlapping the inner, their posterior edges forming a curve; the lateral postanal scale in males lacking any noticeable keel.

Limbs strong, elongate, overlapping a length of about 18 scales when adpressed; seventeen scales about insertion of the forelimb; palm with two (or three) outer wrist tubercles, the inner of the two largest; palm with five or six enlarged padlike tubercles irregularly disposed, all contiguous; other tubercles small; lamellar formula of fingers: 6; 10; 12; 13; 6; no laterally intercalated series of scutes; terminal lamellae not bound tightly about toes; claws narrow, elongate; 18 scales in series about the insertion of the hind limb; on posterior surface of thigh a well-defined, irregular series of enlarged scales; lamellar formula of toes: 7; 9; 16; 17; 11.

Color and markings (preserved in formalin). Above dark blackish-brown with five distinctly outlined light stripes. The median bifurcates on the nuchal or interparietal and its branches run forward to unite on rostral; behind it is visible a short distance on tail; the dorsolateral lines begin on the first superciliary, pass along sides of head to the third scale row, continuing back along this

Measurements of *Eumeces tunganus* Stejneger

Museum Number Sex	U.S.N.M. 82753 ♂	U.S.N.M. 81977 ♂	U.S.N.M. 82751 ♀	U.S.N.M. 82754 ♂	U.S.N.M. 81978 ♀	U.S.N.M. 32755	U.S.N.M. 82752 ♂	U.S.N.M. 81976
Snout to vent	81	73	71	65	61	58	58	57
Tail	.....	111	110*	.....	.....	.....	94	.....
Snout to eye	8	7	6.2	6.2	5.3	5.2	5	5.2
Snout to ear	19	17	14	14	12.3	12	12	12
Snout to foreleg	26	24	23	23	20.2	19	20	20
Axilla to groin	41	38	43	29	32	30	29	30
Width of head	15	12	11	11	10	8	9	8
Length of head	16.2	15	14	14	11.3	11	12.2	11
Width of body	15	12	14	12	11.5	11	12	8
Foreleg	21	21	20.6	18	17	17	18	17
Hind leg	28	28	28	23	23.3	23	23	23
Longest toe	10.6	10.3	10	8.5	8.9	8	8.5	8.2

* Regenerated tip. All specimens from Lu Ding Chiao.

row occupying medially a little more than the half of the width of the scales, visible some distance farther on the tail than the median line; lateral line begins apparently on the rostral, follows the lower part of labial series back to eye, then rises, passing diagonally above the ear and continues back to insertion of the hind leg; the region both in front of and posterior to ear light but not the shade of the light color of the lateral stripe; head a lighter shade than back; a differentiated darker stripe between the dorsolateral and lateral light lines; chin, throat, underside of limbs, anal region, and underside of tail light cream. Tail lighter brown. (A dark line present below the lateral light line.)

Variation. It is with the greatest reluctancy that I have placed under this species, the paratype U.S.N.M. No. 66737, U.S.N.M. Nos. 82751-55 and U.S.N.M. Nos. 81976-78, owing to the fact that all show a completely different color pattern from the type. Doctor Stejneger has pointed out to me that the preserving fluid may have been responsible for the loss of the typical marking. However, it appears to me that the type itself was preserved in the same fluid as the cotype.

These specimens lack the typical "quinquelineatus" pattern which is typical in every way in the type; not only is it wanting in the adults, as might be expected, but likewise in the very young ones as well. There is no trace of bifurcating lines on the head. The general color is apparently gray-olive (in life; now somewhat darkened) with three indefinitely-edged, lighter olive lines bounded by slightly darker stripes, likewise indefinitely-edged. There is also a suggestion of a lateral darker stripe. Another specimen, No. 82754, is uniformly dark olive above, slightly darker on the sides; head buffy. No. 82752, head discolored buff; tail lighter than back; a suggestion of a median line on the neck; chin, labials, and an area before and behind the ear light.

An examination of the scales, however, shows a strict conformity to the type pattern. The temporal pattern, with the peculiar notch in the upper secondary temporal, is identical, as are the general relations of the head scales. The body scales exhibit only the normally expected amount of variation. Thus, the scales in a row from parietal to above anus vary between 63-71, 66 being the most frequent number; scales about the neck, 32 to 36; about middle of body, 26-28, the former number being the most frequent. There is one pair of nuchals, but in three specimens there is an extra nuchal on one side or the other; superciliaries vary from 6-8, the

higher numbers being most frequent; subdigital lamellae of the fourth toe vary from 16-20, the number 18 being most frequent. When adpressed the limbs in all cases overlap, a greater proportional distance in the young. This varies from 6-16 scale lengths.

Remarks. It is conceivable that two species having such similar scale patterns might occupy the same general region and yet not interbreed. The number of specimens available at present of these Szechwan forms is so small, that, lacking data on habits and habitats, it seems wiser to leave this association as it now is, for the present if not for all time.

Distribution. The records available show western Szechwan as the only known habitat, with the following localities: Tung River valley near Luting Kiao, 5,000-6,000 ft. alt.; type locality (U.S.N.M. 2); Lu Ding Chiao (this may be a different spelling of the foregoing name) (U.S.N.M. 11); Lifang fu (Günther, 1896); Valley of the Tung river (Günther, 1896). (See Fig. 35 for distributional map.)

Eumeces xanthi Günther

(Plate 17; Figs. 33, 35)

SYNONYMY

1889. *Eumeces xanthi* Günther. Ann. Mag. Nat. Hist., (6), 1889, p. 218 (type description; type locality, Ichang, Hupeh, China; Pratt, collector; four specimens); Boulenger, Proc. Zoöl. Soc. London, 1890, p. 80 (type referred to); Werner, Abh. K. Bayer Akad. Wiss., II, kl. XXII, B., 2, II Abt., 1903, pp. 343-384 ("Hupe, Szetschwan"); Mell, Lingnan Sci. Journ., 1930, p. 225 (mentioned, as of west China); Stejneger, Journ. Wash. Acad. Sci., XIV, 1924, pp. 383-384 (discussion in relation to Szechwan skinks).

1924. *Eumeces pekinensis* Stejneger. Occ. Papers Boston Nat. Hist. Soc., V, July 21, 1924, p. 120 (type description; type, U.S.N.M. No. 60863; Hsin-Lung-Shan district, Imperial Hunting Grounds, Chihli Province, 665 mi. NE of Peking, China; A. de C. Sowerby); and Proc. U. S. Nat. Mus., LXVI, Art. 25, 1926, pp. 49-51, fig. 2 (three line drawings of head); Schmidt, Bull. Amer. Mus. Nat. Hist., LIV, Art. 4, 1927, pp. 502, 503; ? Mell, Lingnan Sci. Journ., 1930, p. 225 (discussion of distribution); Tchang, Bull. Fan Mem. Inst. Biol., III, 1931, pp. 275-276 (short description; specimens from Peiping); Boring, Liu Cheng-Chao, Shu-Ch'un Chow, Handb. N. China Amph. Rept., Handb. 3, Peiping Nat. Hist. Bull., 1932, p. 58, fig.; Pavlov, Pub. do Mus. Hoangho Pai ho, No. 12, 1932, p. 8 (lists specimens from localities in "Tchewli" and Mongolia).

History. This species was discovered at Ichang by Mr. Pratt, who sent specimens to the British Museum. These were described under the name *Eumeces xanthi.* The description, while accurate so far as it goes, leaves unmentioned three characters of importance: the characters of the temporal scales and the presence or absence of specialized postfemoral and lateral postanal scutes. Moreover, the character of the median dorsal scales was unduly emphasized, and the relationship was stated to be with *Eumeces skiltonianus.*

It is small wonder that Stejneger, on receipt of specimens collected

by A. de C. Sowerby from a northern province, should regard them undescribed. His presumed new form was named *pekinensis*, the holotype being U.S.N.M. No. 60863, with two paratypes, Nos. 60864 and 60865. The type description, a very brief diagnosis published in 1924, was supplemented in 1926 by a very complete description and figures depicting the squamation of the head scales from three views. He compares the species with *latiscutatus* and *elegans*.

Clifford Pope, at a somewhat later time, obtained a series of twelve specimens at a point 13 miles north of Hsien-Lung Shan, Eastern Toombs, Chihli, which were sent to the American Museum of Natural History, New York. Schmidt (1927) reported on this series and published Pope's field notes on the habits of the form.

In the beginning of my study of these forms, Mr. H. W. Parker of the British Museum was kind enough to prepare photographs of the type specimens of Günther's *xanthi*. An examination of these photographs indicated that this species and *pekinensis* are closely related. The photo was later compared with the type of *pekinensis*, and my suspicion that the two species are the same was confirmed. At a somewhat later date I had the privilege of examining two of the types then at the American Museum of Natural History, due to the characteristic kindness of Mr. Clifford Pope. He likewise had independently concluded that *pekinensis* and *xanthi* are synonyms.

Stejneger has already pointed out the possibility that the specimens of *xanthi* reported from Li Fang-Fu, Szechwan, may very probably belong to his recently described species *Eumeces tunganus*, though I believe this is based upon probability only. It likewise appears probable that the Szechwan specimens reported by Werner (1903) may likewise be referable to *tunganus*.

Diagnosis. A medium sized species, characterized by typical dorsolateral and lateral white lines, and a median line bifurcating on the nuchal and joining again on the snout; the median line as well as the others tends to become obsolete in old specimens. One postnasal; two postmentals; primary temporal large, in contact with the larger fan-shaped lower secondary temporal; scale rows 22-24 (rarely 26); nuchals two pairs; seven upper labials; limbs overlap when adpressed except in very large specimens; a group of enlarged, differentiated postfemoral scales and a differentiated lateral postanal; subcaudals widened.

Description of the species. Portion of the rostral visible above triangular, with an area more than half as large as frontonasal;

supranasals relatively large, as large as or slightly larger than the prefrontals, more than double the size of the nasals, forming a strong median suture; frontonasal broader than long, forming a relatively broad suture with the frontal, the sutures with the nasals largest, touching the anterior loreal laterally; frontal longer than its distance from the end of the snout, narrowly truncate anteriorly, rounded posteriorly, touching three supraoculars, wider anteriorly than posteriorly; frontoparietals not noticeably larger than the prefrontals, more elongate, forming a median suture; interparietal with an acute anterior angle, somewhat rounded behind; parietals broad, relatively short, truncate posteriorly, not enclosing the interparietal; two pairs of nuchals (two-three in one specimen).

Nasal completely divided, low, elongate, the nostril almost directly above point where the rostrolabial suture reaches the mouth; postnasal large; anterior loreal much higher than wide, higher than the posterior; anterior part much higher than posterior part of the second loreal, the scale longer than high (vertically broken in one specimen); four supraoculars; seven superciliaries (normally), the anterior very much larger than the last, which is fan-shaped and not greatly higher than wide; a tiny preocular and two small postoculars; presuboculars two; postsuboculars five; upper palpebral scales not wholly separated by intercalated granules, at least three or four touching the superciliaries; usually four enlarged scales on the lower eyelid, separated from the subocular by three rows of scales; primary temporal large (approaching the size of the sixth labial in one specimen), touching lower secondary temporal; latter fan-shaped, larger than primary temporal; upper secondary large, its upper and lower sides parallel for more than half its length; two tertiary temporals, the upper largest; two superimposed postlabials, followed by three very tiny scales; two low lobules on the edge of ear; 21 or 22 scales about ear opening; seven upper labials, the first not larger than others of the four preceding the subocular; seventh labial largest; lower labials six.

Mental large, with a much larger labial border than the rostral; two postmentals; three pairs of chinshields, the anterior pair narrowest, in contact; postgenial very large, bordered anteriorly by a small narrow scale much longer than wide; scales about the neck posterior to ear, 32; about constricted portion of neck, 30; in axillary region, 40; about body, 24 (26 in one); about base of tail, 20; scale rows generally parallel, but forming somewhat irregular lines on the sides; the median scale rows rather distinctly but not

greatly widened, except on neck; 59 to 60 scales from parietals to a point above vent; eight scales bordering anterior edge of vent, the two median greatly enlarged, the three laterals diminishing in size toward the outer edge, the outer scales overlapping the inner; 99 subcaudals, the two nearest anus broken into smaller scales; legs moderately large, overlapping length of three or four scales when adpressed; about 15 scale rows about insertion of foreleg; outer wrist tubercle well developed, with the adjoining scale modified; a second padlike tubercle on palm below base of first digit; seven enlarged tubercles on the palm; lamellar formula: 6; 10; 12; 12; 8; lamellae not compressed or keeled below; 18 scales about in-

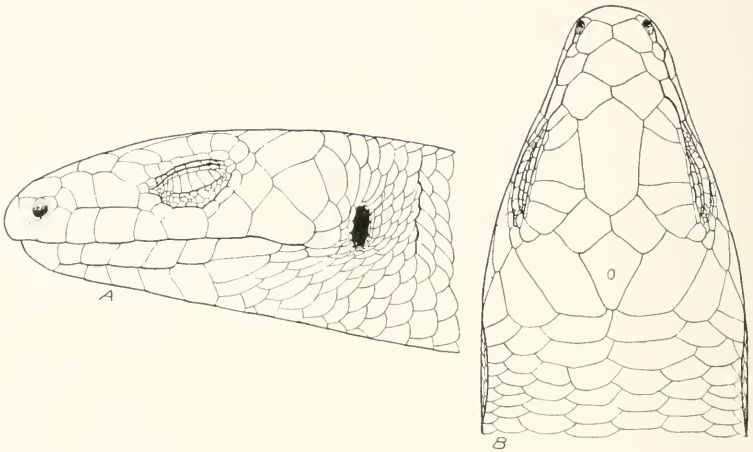

FIG. 33. *Eumeces xanthi* Günther. Field Mus. No. 7396; Hsien-Lung-Shan district, Chihli, China. A, lateral view of head; B, dorsal view of head. Actual head length, 10 mm.; width, 8 mm.

sertion of hind leg; a group of greatly enlarged scales on lower posterior edge of femur, the scales not following the regular series; scales on heel enlarged, separated by two granules; two enlarged tubercles on inner side of foot greatly differentiated from all other granules on the foot, which are subequal and not imbricated on the outer part of foot. Lamellar formula of toes: 6; 11; 14; 17; 11.

Claws on the toes distinctly smaller than those on the fingers; the lateral postanal scale modified, with a low but usually discernible keel.

Color (in alcohol). Dorsal ground color grayish, flecked with brown; a median bluish-gray (in young, whitish) stripe, bifurcating on the nuchal, runs forward to the rostral, covering the inner third of the two median scale rows; a pair of dorsolateral lines, originat-

ing on anterior superciliary, continues back passing through the middle of the third scale row, occupying at least one half of each scale; median line clearly edged with dark brown, the dorsolateral line dimly edged with brown above. A broad, brown, lateral stripe covers a width equivalent to two scale rows. The labials are all rather light, but a more distinct whitish or bluish white line begins below anterior part of eye, passes across the upper part of the last labials to upper part of ear, then continues behind the ear, passing three scale rows above insertion of forearm along the side; it is broken by the insertion of the hind leg, then continues some distance on the sides of the tail; this lateral line borders the lateral brown stripe and is bordered below by an indefinite brown stripe. The lower sides and abdomen are bluish to bluish-gray; throat and breast, underside of limbs and tail and preanal scales, cream. Usually a small brown area is present on the labials in front of the ear.

Measurements of *Eumeces xanthi* Günther

Museum Number	B.M.N.H. Cotype	B.M.N.H. Cotype	U.S.N.M. 60865	U.S.N.M. 60864	U.S.N.M. 60863
Snout to vent	76	72	62	59	54
Tail	132	reg.	.....	.....	.....
Snout to eye	6.3	6	5.1	5	5
Snout to ear	15.4	14	12	11.7	11.5
Snout to foreleg	25	22	22	20	19.5
Axilla to groin	41	40	32	30	21
Foreleg	22	20	17.5	16	16
Hind leg	29	27.3	22.4	22	20.2
Width of head	11	10.3	9	9	8
Length of head	14	12.5	10.5	10.2	9
Width of body	14	14	8	10	10
Longest toe	10.4	10	7.5	7.5	7.5

Cotypes, Hupeh, Ichang; U.S.N.M. Nos. 60863-60865, Hsien-Lung-Shan District, Chihli Prov., China.

Variation. Stejneger (1926) has noted in the paratypes a somewhat smaller frontonasal and states that the enlarged postfemoral scales are more localized as "patches," and smaller in the paratypes than in the type. The following variations are evident in northern "*pekinensis*" specimens: Scale rows about middle of body 22 to 24, the number 22 occurring seven times, 23 two times and 24 once. The number of scale rows from occiput to above anus 54 to 58, 56

being the most common number. The labial number is seven (one shows only six), the last constantly largest; superciliaries vary from six to eight; lamellae under fourth toe from 14 to 16. The relation of the supraoculars to the frontal is generally constant (in one case only is the third separated slightly from the frontal).

Older specimens tend toward a loss of the light lines. These are very strongly defined, and strongly contrasted with the black or black-brown ground color, in the young. In young adult specimens the ground color becomes more brownish and in some males the ground color is greenish-olive instead of black or brown, and the head is olive-brown.

The species is relatively small, the largest specimen being 79 millimeters, snout to vent; the tail is 130 millimeters; snout to foreleg, 25; foreleg, 16; hind leg, 23. The snout to foreleg distance averages 34 percent of the body length; the hind leg, 34 percent; the tail length averages 60 percent of the total length. The axilla to groin measurement is approximately 50 percent of the body length; the limbs in larger specimens overlap or are very narrowly separated when adpressed to body.

Remarks. The northern form "*pekinensis*" differs from the southern *xanthi* in slightly different scale averages, which will doubtless disappear with larger series of the southern specimens. Thus, usually three out of four specimens of *xanthi* have 24 scale rows, while one shows 26 rows; in *pekinensis* the usual number is 22 rows, 23 and 24 rows also occurring. This variation is no greater than occurs in many other species of *Eumeces;* the number of scales from parietals to above anus is 59 to 60 in *xanthi* and from 56 to 59 in *pekinensis;* the lamellae under the fourth toe in *xanthi* are 16 to 17, in *pekinensis* 14 to 17.

Günther seemed to emphasize the size of the median body scales. The northern *pekinensis,* when compared with the *xanthi* types, shows that in certain specimens there is no difference or only a slight apparent difference in the size of these scales in the two forms, while in others they are somewhat smaller. The color patterns, when specimens of equal age and sex are compared, show no differences.

Eumeces xanthi agrees with *elegans* in having enlarged postfemoral scales, the postnasal and the less specialized granular scales on the feet, but *E. elegans* has only one postmental, one pair of nuchals, more numerous scales under the fourth toe, and temporals like *E. latiscutatus. E. xanthi* agrees with *chinensis* in having two postmentals and in temporal scalation, but it has a postnasal, en-

larged postfemorals and lacks the specialized foot scales; from *E. latiscutatus* it differs in having the double postmental, the longer snout, fewer scale rows and very different temporals.

Pope, quoted by Schmidt (1927, pp. 502-503), states that the eggs of the species are deposited in burrows under rocks. The burrows are twelve inches in length, two inches wide and less than an inch in depth; the number of eggs varies from four to eight. The female remains with the eggs, and from the number of nests found in one small locality it appears that the breeding females assemble in colonies. The eggs were being deposited August 1-4.

Distribution. If one disregards Günther's (1896) record of this species at Li-Fang-Fu Valley of the Tung river, Szechwan, and that of Werner (1903) for Szechwan (which are quite likely records of *Eumeces tunganus* Stejneger), this species is only known with certainty from the provinces of Hupeh, Chihli and Mongolia. One may surmise that it must also occur in Honan. Stejneger (1926) has suggested that specimens collected by Elpatjewsky and Sabanejew on the Ussuri coast at Olga and Vladimir Bays may belong to this species (*pekinensis*) rather than to *marginatus* or *latiscutatus*, as they were identified by *Nikolski* (1915). Should Stejneger be correct in his surmise, the range would be extended a considerable distance to the northeast. (See Fig. 35 for distributional map.)

Locality records:

CHINA: *Hupeh:* Ichang, in the valley of the Yangtze-Kiang river (types, British Mus. 4; Pratt Coll.) (Werner, 1903, "Hupe," 9).

Chihli: Imperial Hunting Grounds, Hsien-Lung-Shan District (U.S.N.M. 3, types of *pekinensis;* Sowerby Coll.); 13 miles north Hsien-Lung-Shan, Eastern Toombs (Field 3) (M.C.Z. 1) (A.M.N.H. 8); Peiping (M.C.Z. 1) (Tchang, 1931, 1); Pait'a (Pavlov, 1932); Paiho (Pavlov, 1932); Hei lung tang (Pavlov, 1932); Nanjeli, Western Chihli (Pavlov, 1932).

Mongolia: "Siao wan wan kiow" (Pavlov, 1932).

Eumeces elegans Boulenger

(Plate 18; Figs. 34, 35)

SYNONYMY

1863. *Mabouia chinensis* Gray. Ann. Mag. Nat. Hist., (3), XII, 1863, p. 225 (Tamsui, Formosa); Günther, Rept. Brit. India, 1864, p. 83 (part.), pl. X, fig. f (*elegans*) (Ningpo, China; non Gray, 1838).

1879. *Eumeces pulchra* Bocourt. Miss. Sci. Mex., Zoöl., Rept., Liv. 6, p. 423 (Non Duméril and Bibron).

1887. *Eumeces elegans* Boulenger. Cat. Lizards Brit. Mus., III, 1887, pp. 271, 272 (type description; type not designated; Shanghai, Ningpo, Formosa, Pescadore Is., Ku Kiang Mts.); and Proc. Zoöl. Soc. Lond., 1899, p. 162 (Fukien); Boettger, Offenb. Ver.

Naturk., 24-25 Ber., 1885, p. 144; Boettger, Cat. Rept. Samml. Mus. Senckenb. Nat. Ges., Teil I, 1893, p. 111 (Ningpo); and Ber. über Senckenb. Nat. Ges. Frankfort, 1894, p. 146 (Ningpo); Stejneger, Jour. Sci. Coll. Imp. Uni. Tokyo, XII, 1898, pl. III, p. 220 (Taipa, Formosa; Pescadores); Werner, Abh. K. Bayer. Akad. Wiss., II, Kl. XXII, Bd. II, Abt., 1903, pp. 169, 203, 372; Stejneger, Bull. U. S. Nat. Mus., 58, 1907, pp. 202-205, figs. 182, 183 (Taipa, Formosa, Pescadores); and Proc. U. S. Nat. Mus., XXXVIII, 1910, p. 99; Van Denburgh, Proc. Cal. Acad. Sci., (4), III, 1908-1913, (1912), pp. 223-225 (China, Pescadores, Formosa; description with notes on variation); Stanley, Jour. N. China Asiat. Soc., XIV, 1914, p. 25; Vogt, Sitz. Ber. Ges. Naturf. Freunde Berlin, 1914, p. 100 (Canton); Vogt, Arch. für Natur., 88 Jahr, 1922, Abt. A., Heft 10, pp. 135-146; Mell, Arch. für Naturg., 88 Jahr, 1922, Abt. A., Heft 10, p. 114; Stejneger, Proc. U. S. Nat. Mus., LXVI, 1925, p. 45; Schmidt, Bull. Amer. Mus. Nat. Hist., LIV, 1927, p. 505 (numerous localities); Pope, Bull. Amer. Mus., LVIII, 1927, pp. 386-388, Fig. 2b (numerous localities, with notes on variation); Wu, Sci. Reps. Nat. Cent. Univ. Nanking, Ser. B., I, No. 7, 1930, p. 53; Gee, Bull. Dept. Biol. Yenching Uni., I, No. 1, 1930, pp. 53-84; Tchang, Bull. Fan Mem. Inst. Biol., II, 1931, p. 276 (Nanking); Chang, Cont. Biol. Lab. Sci. Soc. China, VIII, Zoöl. Ser. 2, 1932, p. 18, fig. 4 (description of specimens from Szechwan); Boring, First Ann. Rep. M. B. A. C., 1932, p. 112 (locality records).

1912. *Eumeces xanthi* Barbour. Mem. Mus. Comp. Zoöl., XL, 1912, p. 134 (Ichang) (not of Günther, 1889).

1926. *Plestiodon elegans* Sun. Cont. Biol. Lab. Sci. Soc. China, Vol. II, No. 2, 1926, p. 5.

History. The brevity of Gray's early description (1838) of a Chinese skink under the name of *Tiliqua chinensis* seems to have been responsible for certain subsequent writers referring all Chinese specimens of the genus to Gray's species. Thus, Swinhoe (1863), Günther (1864), and perhaps others confused the species under discussion with *chinensis*. Apparently, it was not recognized until 1887, when Boulenger described it from specimens from China, Formosa, and the Pescadores Islands. He failed to designate a type or type locality. After this time the name appeared in literature, with reports of specimens from various localities. Stejneger (1907) gives a very good description of a Formosa specimen and discusses the relationships of the species, concluding that the form is more closely related to *latiscutatus* than to *marginatus*. Van Denburgh (1912) gives an excellent summation of the variations in the Chinese specimens, and in those from Formosa and the Pescadores, presenting the data in tabulated form. Stejneger (1926) points out that Barbour (1912) has mistaken a young specimen of *elegans* from Ichang for Günther's *xanthi* from the same locality.

Schmidt (1927) and Pope (1929) discussed the Chinese specimens in the American Museum of Natural History, the greater part of which were collected by Pope. This series is very extensive, comprising 198 specimens of all ages.

Diagnosis. A typical five-lined species of large size, the median light line bifurcating on the nuchal; dorsolateral line from the prefrontal extending more than two thirds the length of tail; the lateral line begins as a series of labial dots more or less connected,

passing through the ear, involving all except lower part; no sublateral line; brown lateral stripe distinct; a large patch of irregular scutes on postfemoral region; a keeled lateral postanal scute; postnasal absent; a single postmental; series of scutes following the emarginate, fan-shaped upper secondary temporal well differentiated in males; lower secondary temporal with sides nearly parallel; scales in 26-28 rows.

Description of species (from Chinese specimens). A considerable portion of the rostral visible from above; supranasals moderately large, not or rarely approaching the size of the prefrontals; frontonasal usually large, usually in contact with the loreals (rarely not) and usually in contact with the frontal (frequently not); prefrontals variable in size, apparently never as large as the frontoparietals, in contact with both loreals, their longest suture with the frontonasal. Frontal moderate, much longer than its distance from the end of the snout, usually only slightly widened anteriorly, the sides converging slightly posteriorly, in contact with three supraoculars; frontoparietals longer than wide, occasionally as wide as long, forming a median suture equal to half their length; interparietal usually less in area than the frontoparietals, narrowed posteriorly, and usually rounded behind, always in contact with the nuchal; parietals large, their greatest width about three fourths of their length; a single pair of nuchals (very rarely two complete pairs), very deep; this followed, behind the outer half of the scale, by two differentiated scales, one following the other, the hindermost largest, separated from their fellows by two scales; nasal moderate, at least partially divided, the posterior part behind nostril larger than anterior part; no postnasal; anterior loreal not twice as wide as high, very little higher than the posterior, which is usually three fourths as high as long, touching usually only two labials; two presuboculars; four supraoculars, three touching the frontal; usually eight or nine superciliaries, the anterior nearly three times as large as the last; a small preocular, followed by a small scute and one or two small granules; a pair of postoculars; usually four postsuboculars; primary temporal large, rectangular, broadly in contact with the two secondary temporals; the upper of these is very large, nearly triangular, the posterior edge emarginate, followed posteriorly by three nearly equal-sized vertical scales, the last of which contacts the larger of the postnuchal scales; lower secondary temporal with sides nearly parallel, the posterior end somewhat rounded; tertiary temporal small, entering ear; seven upper labials, the first

slightly higher and larger than succeeding three; seventh labial always very much larger than sixth; four median palpebral scales directly in contact with the superciliaries; lower eyelid with four or five large plates separated from the subocular by two (rarely three) granular rows; two superimposed postlabials follow the seventh labial, separating it from the ear; two or three inconspicuous auricular lobules; about 20 scales surrounding the ear; mental large, with a labial border much greater than rostral; postmental relatively small, undivided; three pairs of chinshields, the anterior smallest, the third pair largest, followed by an enlarged postgenial which is bordered on its anterior inner edge by a scale longer than wide.

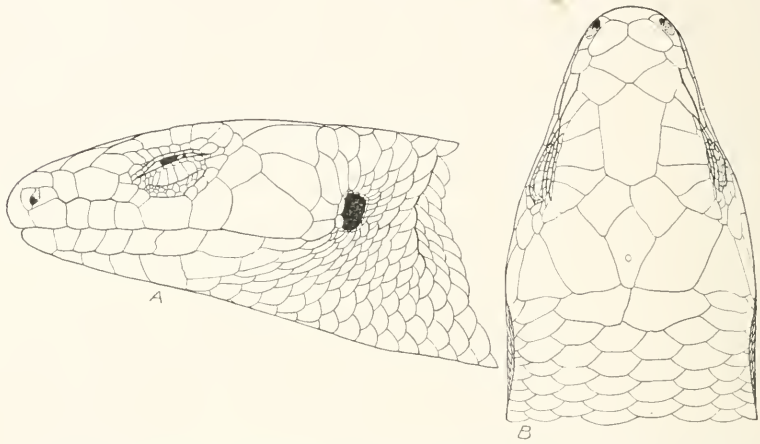

FIG. 34. *Eumeces elegans* Boulenger. Field Mus. No. 7327; Ningkwo, Anhwei, China. Male. A, lateral view of head; B, dorsal view of head. Actual head length, 12.4 mm.; width, 11 mm.

Scales parallel on the sides, the median pair of scale rows not or very slightly larger than adjoining rows or the lateral scales; about 38-40 scales about neck behind ear; 32-36 scales about constricted portion of the neck; 38-40 scales about body in axillary region; about middle of body, 26-28 rows; about base of tail, 15; subcaudal scales greatly widened, about 105 in the series; lateral postanal scute strongly keeled; eight preanal scales, the median pair very large, the smaller outer scales overlapping inner scales.

Fifteen scales about insertion of arm; a series of five or six rows of granular scales in axilla; outer wrist tubercle prominent, with two or three smaller adjacent scutes; palm with about four unequal-sized, enlarged tubercles; lamellar formula of fingers: 6; 10; 12; 13; 8; the basal lamella of each toe enlarged and thickened.

Eighteen scales about insertion of the leg. A patch of enlarged irregular scales on lower back part of femur; heel with two pairs of padlike tubercles separated medially; sole with one or two larger tubercles; a series of more or less equal-sized scales reach the base of the fourth toe; the scales of the outer side of the sole flat, imbricated. Lamellar formula of toes: 6; 12; 16; 18; 13. Terminal lamellae not tightly bound about claws; intercalated series of digital scales on the basal phalanx only.

Color. Young, dark blackish or brownish-black, with five strongly defined cream lines, the median bifurcating on nuchal, extending halfway back on tail; dorsolaterals from the prefrontals or the first superciliaries, follow the lower two thirds of the third scale row, rarely encroaching on the edges of the fourth posteriorly; lateral line on labials a series of more or less connected spots, passes back involving the upper half or two-thirds of ear, then passing back along the sixth and seventh row, chiefly on the sixth posteriorly; below the lateral stripe there is a lateral dark line, which grows lighter on its lower edge, merging into the lighter gray color of the sides of abdomen; immaculate cream below. Tail blue above, lighter below, sometimes lavender. This type of coloration is retained with little change in the adult females save the dark ground color, which is less intense save on the sides where a broad darker stripe is evident. In adult males the lighter lines gradually become obsolete, and in the oldest males there is practically no trace of the typical pattern. The dorsal surface becomes olive, the head yellowish-red (red in life?). There is, however, usually a lateral brown stripe evident.

Variation. Thanks to the authorities of the American Museum of Natural History, and to the courtesy of Dr. G. K. Noble and Mr. Clifford Pope, the very extensive series of specimens of this museum was made available despite the fact that Mr. Pope himself was studying them at the same time for a work on the herpetological fauna of China. Altogether about 330 specimens from a large number of localities have been available. The large number of specimens has been almost bewildering, and complete statistical data on variation was not taken on more than a half of the specimens by me. The variational data here presented is largely a compilation from Pope, Schmidt, Stejneger, and Van Denburgh, as well as data taken by myself.

Seven is the typical number of upper labials, eight occurring (in about 300 specimens) only six times. In these eight specimens,

Measurements of *Eumeces elegans* Boulenger

Museum	A.M.N.H.	M.C.Z.	M.C.Z.	M.C.Z.	M.C.Z.	M.C.Z.	U.S.N.M.	U.S.N.M.	U.S.N.M.	U.S.N.M.
Number*	33075	28994	28983	28987	28947	28949	78221	78218	78225	78227
Sex	♂	.....	♂	♂	♀	♂	♂	♂	.....	.....
Snout to vent	93	86	80	77	72	64	61	57	46	33
Tail	.....	.....	146	147	.....	128	113	.....	.....	48
Snout to eye	6.8	6.4	6.2	6	5.2	5	5.3	5	4	2.5
Snout to ear	22	19	18	17	13	13	13	11.5	10	7.6
Snout to foreleg	30	27	27	25.2	22	22	21	20	15.2	12
Axilla to groin	18	44	42	39	41.5	35	32.5	30	23	17
Width of head	16.5	15	15	14	10	9	11	8	7	5
Length of head	15.2	17	17	11	12.3	11.7	12.3	9.8	8.8	7.2
Width of body	16	17	16	15	.....	1	13	12	10	6
Foreleg	24	25	23	20	20	18	19	17	14	11.2
Hind leg	36	34	33	31	28	27	25	23	19	14
Longest toe	16	13	11.2	12	10	10	9.8	.....	.....	.....

*No. 33075, Yenping, Fukien; 28947, Fengshui Chekiang; 28949, Yen Chow Chekiang; 28983, 78225, 28987, 28994, 78218, 78221, 78227, Tungli Chekiang.

five rather than the typical four labials precede the subocular. About 22 specimens have only six upper labials on one or both sides, with only three preceding the subocular. The supraoculars are invariably four, but in 22 specimens only two supraoculars touch the frontal on one or both sides. The number of scales between the parietals and a point above the anus is 54-58, the number 56 being most frequent, while 54 or 55 is a close second. Higher numbers are very rare. In 264 specimens the scale counts about middle of body are: 25 in nine specimens; 26 in 166; 27 in 33; 28 in 56. The maximum size is 93 mm., snout to vent measurement, five specimens having been examined which measure 90 mm. or more. Recently hatched specimens measure 25-28 mm., the larger size being the more frequent.

Van Denburgh (1912) gives a "key" to the variable characters with relation to geographical habitat. The characters noted as to number of scale rows were: China, usually more than 26; and Koshun Formosa, usually 24. From my foregoing statements it is seen that the mainland specimens have in far larger proportion only 26 scale rows. I have had access to Van Denburgh's material from these localities and the only point of difference that seems pertinent is a slightly lower average of lamellae under the fourth toe and a smaller size in the Pescadores specimens. Moreover, the color pattern appears to be lost earlier in both males and females, and the posttemporal scales become thickened, as do the other head scales when the specimens are smaller. One specimen of this lot has the parietals enclosing the interparietal; one has the anterior loreal divided; a third has a postnasal on one side.

Boulenger (1899), in speaking of the coloration of adult males, mentions that they "have the sides of head and neck of a bright vermillion, which color is continued on the side of the body as more or less distinctly defined stripes above and below the light streak extending from the ear."

Szechwan specimens mentioned by Stejneger (1926) have the first pair of chinshields separated.

Pope (1929) notes that the color of the stripes in young is gilt.

Remarks. Pope (1929) expresses the opinion that this species is generally a mountain form, and states that it was never seen on the open irrigated plains of the plateaux and the valleys. Pope (1929) also states that the young emerge from their underground "nests" about the first and second weeks of August. There are from 7 to 10 eggs in a clutch. The size of the fully developed eggs

(ready to hatch) are 24 to 26 mm. by 12 to 13.2 mm. The shell is yellow-brown. The largest specimen measured by Pope was 96 mm. snout to vent.

Both Stejneger and Van Denburgh realized the lack of wisdom in naming the Formosan and Pescadores Islands forms. In neither are the scale variants of such a character as to warrant such treatment; while the precocious attainment of adult characters, and the apparently smaller size of the specimens from the Pescadores Islands may seem important, I do not care to christen them with a trinomial.

Distribution. The species is widely distributed on the Asiatic mainland, occurring from the coast to the central plateau region, in the Chinese Provinces bordering the Yangtze, and lying to the south. I have records for all provinces except Kweichow and Kwangsi. It is also known from the Chusan Archipelago, Pescadores Islands, and Formosa.

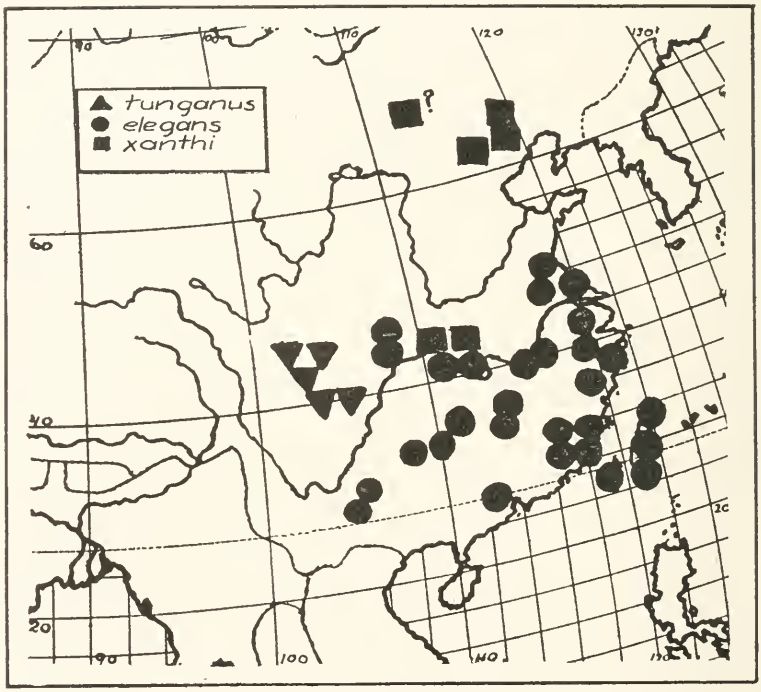

FIG. 35. Distribution of the continental Asiatic species of the *Fasciatus* group.

Locality records:

CHINA:

Chekiang: Mo-Kan-Shan, near Huchow, 1,000-1,500 ft. elev. (C.A.S. 5); Ningpo (Brit. Mus. 5); Snowy Valley, Ningpo (Brit. Mus. 4); Chusan Archipelago (Brit. Mus. 2); Da-laensaen, SW Ningpo (Brit. Mus. 4); Tung Yung Is. (Brit. Mus. 6); Tunglu (Mich. 20); Chapoo (Boettger, 1894); Wenchow (U.S.N.M. 1) (M.C.Z. 2); Zungli (U.S.N.M. 10) (M.C.Z. 63); Geng-shin (M.C.Z. 2).

Kiangsu: Nanking (C.A.S. 4); Shanghai (Brit. Mus. 2) (Sun, 1926).

Fukien: (Basel 1) (A.M.N.H. 2); Foochow (C.A.S. 6) (U.S.N.M. 6) (K.U. 1); Kuatun, N.W. Fukien (Brit. Mus. numerous specimens) (Field 2); Yenping (Field 3) (A.M.N.H. 15); Ch'ungan Hsien (A.M.N.H. 179).

Kiangsi: Kiukiang Mts. (Brit. Mus. 1); Pingshiang (Senckenb. 1) (München Z.S.B.S. 4) (Basel 1).

Yunnan: (A.M.N.H. 2); Yunnan Fu (Brit. Mus. 3) (A.M.N.H. 1).

Hunan: Changsha (A.M.N.H. 1).

Anhwei: Ningwo (Field 7) (A.M.N.H. 27).

Hupeh: Ichang (M.C.Z. 1).

Kwangtung: Canton (Vogt, 1914).

Szechwan: Wanhsien (A.M.N.H. 1); Suifu (U.S.N.M. 3); Kiating (U.S.N.M. 1).

Formosa: (C.A.S. 1); Kan-shirei (C.A.S. 18); Maru Yama (C.A.S. 2); San-shi-ka (C.A.S. 1); Taiuan (C.A.S. 1); Keelung (C.A.S. 2); Taipah (C.A.S. 1); Tamsuy (Brit. Mus. 1); Taipa (U.S.N.M. 1) (Sci. Coll. Tokyo 2).

Pescadores Is.: (C.A.S. 15) (Brit. Mus. 4) (Sci. Coll. Tokyo 1).

Eumeces oshimensis Thompson

(Figs. 36, 40)

SYNONYMY

1881. *Eumeces quinquelineatus* Doederlein. Mitt. Deutsch Ostasian Ges., Bd. III, Heft 24, 1880-1884 (1881), p. 147 ("Amami Oshima").

1912. *Eumeces oshimensis* Thompson. Herpetological notices, No. 2, June 28, 1912, p. 4, privately printed (type description; type locality Kikaigashima, Loo Choo Islands; type C.A.S. No. 21729; Kuhne Coll.); Barbour, Occ. Papers Mus. Zoöl. U. of Mich., No. 44, Sept. 12, 1917, pp. 1-9 (regarding date of publication of type description).

1912. *Eumeces marginatus amamiensis* Van Denburgh. Advance Diagnoses of New Rept. Amph. from Loo Choo Is. and Formosa, privately printed, July 29, 1912, pp. 4, 5 (type description; type locality, "Amami Oshima, Loo Choo Islands, Japan"; type C.A.S. No. 21615); and Proc. Cal. Acad. Sci., (4), III, 1908-1913 (Dec. 16, 1912), pp. 217-219 (*Amaniensis* [*sic*]) (detailed description with a discussion of variations and relationship).

1912. *Eumeces marginatus kikaigensis* Van Denburgh. Adv. Diag. New Rept. Amph. Loo Choo Is. Formosa, July 29, 1912, p. 5, privately printed (type description; type locality "Kikaigo shima, Loo Choo Islands"; Kuhne Coll.); and Proc. Cal. Acad. Sci., (4), III, 1908-1913 (Dec. 16, 1912), pp. 219-221 (complete description, with a discussion of variation and relationship).

History. Apparently the first record of this species is that of Doederlein (1881) who reports *Eumeces quinquelineatus* from "Amami-Oshima" as follows: "Von Eidechsen fand ich Eumeces quinquelineatus L. sehr hausig."

In 1912, from a large series of specimens in the California Academy of Science, the species was described by Surgeon J. C. Thompson as follows: "Specimens from Amamioshima and Kikaigashima, two islands in the Oshima group of the Loo Choos may be distinguished from the typical form found in Okinawa Island. They differ in having regularly 28 scale rows round the middle of the body, and in the two dorsal series not being enlarged. These differences appear constant through a fairly large series."

"For those who feel the necessity of giving to such a geographical variation a new name or of promoting it to subspecific rank, the name *Eumeces oshimensis* is proposed. The type would then be No. 21729, California Academy of Sciences; male; April, 1910, Kikaigashima, Loo Choo Islands." The date on the private publication is June 25, 1912.

A little more than one month later (July 29, 1912) Dr. John Van Denburgh published privately a short paper describing two subspecific forms of *Eumeces marginatus* from the material mentioned in the preceding paper, a form called *Eumeces marginatus kikaigensis* and one called *Eumeces marginatus amamiensis*.

The first of these is from the type locality of Thompson's *oshimensis*. It is described as follows:

"*Diagnosis.* One azygous postmental; no patch of much enlarged scales on back of thigh; no postnasal; posterior loreal usually long, usually in contact with three superlabials; sixteen to twenty-one plates under fourth toe; usually twenty-eight (sometimes twenty-six) scales around middle of body; young with one median and two lateral light lines, latter narrow and separated by not less than width of two scales; lower lateral line separated from forelimb by less than distance between lateral lines, and running at about the level of top of hind limb but below top of ear; scales of first row on each side of middorsal line usually not appreciably wider than those of next dorsal rows. Superciliaries not less than eight; upper lateral line broader, on scales of third and fourth rows from middorsal line."

"*Type.* California Academy of Sciences, No. 21,628, Kikaig Oshima, Loo Choo Islands, Apr. 30, 1910."

The second subspecies is described as follows:

"One azygous postmental; no patch of much enlarged scales on back of thigh; no postnasal; posterior loreal long, usually in contact with three supralabials; seventeen to twenty-one plates under fourth toe; twenty-six (rarely twenty-four or twenty-eight) scales around the middle of body; young with one median and two lateral light lines, latter broader but separated by not less than width of two scales; lower lateral line separated from forelimb by less than distance between lateral lines, and running at about the level of top of hind limb but below top of ear; scales of first row on each side of middorsal line very rarely wider than those of next dorsal rows; superciliaries not less

than eight; upper lateral line broader, on scales of third and fourth rows, from middorsal line."

"*Type*. California Academy of Sciences, No. 21615, Amami Oshima, Loo Choo Islands, Japan, April 26 to May 1, 1910."

It is obvious from a perusal of the two Van Denburgh descriptions that the characters used to separate the subspecies are so trivial that in my opinion the separation is unwarranted; hence the two forms are here regarded as synonyms and, likewise, synonyms of *Eumeces oshimensis* Thompson.

Diagnosis. Closely related to and having general characters of *Eumeces marginatus* but the two median scale rows not distinctly widened; the dorsolateral light line on the third and fourth scale rows; 26 or 28 scale rows around the body; no postnasal; one postmental.

Description of species (from topotypes). Portion of rostral visible above, large, often approaching the size of the frontonasal; supranasals rather large, occasionally nearly as large as the prefrontals; frontonasal moderate, wider than long or the length equalling the width, almost always in contact rather broadly with the frontal; prefrontals variable in size, their longest suture with the frontonasal; frontal elongate, longer than its distance from the end of the snout, wider anteriorly, touching three supraoculars; frontoparietals longer than wide, forming a median suture almost always larger than the prefrontals; interparietal usually of equal or greater area than a frontoparietal, in contact with the nuchal; normally one pair of nuchals, rarely none, or two; the two scales following outer half of nuchals enlarged, the anterior usually the smaller; nasal moderate, divided by a suture, the anterior part often the size of the posterior; no postnasal; anterior loreal higher than posterior, the lower part usually wider than upper; posterior loreal longer than high, usually in contact with three labials; two presuboculars, the anterior usually not larger than the posterior; usually nine superciliaries, rarely eight or ten, the anterior at least twice as large as posterior; a small preocular; four supraoculars, the largest wider than the frontal; four or five postsuboculars; two small postoculars. The median palpebral scales in contact with the superciliaries; primary temporal nearly rectangular, rather large; lower secondary narrow, elongate, the sides nearly parallel, somewhat rounded posteriorly; upper secondary very large, triangular, emarginate behind, followed by two or three scales, the anterior usually the smallest. (These more or less thickened in old males.)

Seven upper labials, the last largest, much larger than sixth; the first larger than the three succeeding scales; lower eyelid with five or more large opaque scales, separated from the subocular by two (rarely more) rows of granules; two superimposed postlabials, the lower largest, both entering auricular border or separated from it by a small scale; usually three small auricular lobules; usually six lower labials; postmental single, large; three pairs of chinshields, the anterior smallest; a large postgenial, bordered internally by scales longer than wide; 17 to 20 scales about the ear.

Scales on sides parallel; median scales on the back not wider than adjoining rows. Scales about neck behind ear 34 to 36; about con-

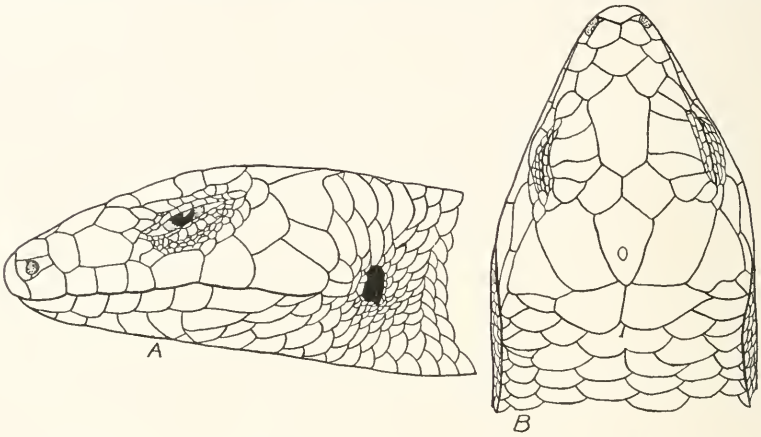

FIG. 36. *Eumeces oshimensis* Thompson. U.S.N.M. No. 64210 (C.A.S. No. 21547); Amamioshima, Loo Choo Islands, Japan. A, lateral view of head; B, dorsal view of head. Actual head length, 14 mm.; width, 12 mm.

stricted portion of neck 28-32; about axillary region 36-38; about middle of body 26-28; 15-17 about the base of the tail; 100-103 subcaudals, much widened; six or eight scales border the anus, the median pair greatly enlarged, outer diminishing in size, the outer scales overlapping the inner. A large, well-differentiated, keeled, lateral postanal scute; about thirteen scales about arm insertion; lateral wrist tubercles usually two or three; four or five scattered palmar tubercles; lamellar formula for fingers: 7; 12; 12; 13; 9, the basal lamellae enlarged. About 19 scales around insertion of hind limb; two inner heel tubercles, usually padlike, outer pair either flat or rounded; outer scales on sole somewhat large, usually imbricate; no or only one small sole tubercle; lamellar formula for toes: 8; 12; 18; 21; 13. Terminal lamellae not tightly bound about claws; intercalated scales on the fourth toe not or rarely extending

beyond the basal phalanx. Limbs well developed; limbs, adpressed, overlapping the length of fourth toe or somewhat more. Pitting on scales rather inconspicuous, largely obsolete in adults, but some in posthumeral and postfemoral region.

Color. Typically five-lined in young, the median cream line bifurcating on the nuchal, the branches running forward and reuniting in very young, but in somewhat older specimens appear to terminate on the prefrontals; posteriorly the median line terminates a short distance back of the base of the tail; the dorsolateral line begins on the first supraocular and follows back the edges of the third and fourth scale rows, continuing a short distance on the tail; lateral light line represented on labials by a few spots, then passes through the middle of the ear and follows along side on the sixth scale row, usually. The general ground color is blackish in young, but very early becomes a dark brown, and later an olive color appears in the middle of each scale, while the darker color is evident only along the dorsolateral and median cream lines. The area between the dorsolateral and lateral lines is usually darker brown than the back and this color is never completely lost; the ventral surfaces are creamy white, save on the tail in very young, where, like the dorsal surface, it is blue.

Young adult and old males lose practically all evidence of cream lines, becoming a uniform brown-olive above, with a lateral brown or reddish-brown stripe from the snout along the side to the base of the tail. This brown line is bordered below by light grayish, which merges into the cream color of the ventral surfaces. There is in many specimens a suggestion of the lateral line and it is most evident behind the ear, when present.

The heads of old males become much widened, and take on an amber or light yellow-brown color. In certain old males the entire upper surface of body is light brown, with no evidence of markings in front or back of ear. The adult females retain some trace of the median and dorsolateral lines, but these are now of a shade of brown or olive and usually dim, and the ground color never becomes as uniform as in the males.

Variation. Among the 79 specimens available to Van Denburgh, he noted that all have one postmental, no postnasal. There were only two exceptions in which the frontal and frontonasal were separated. Two specimens had the frontonasal divided. Only two specimens failed to have the posterior loreal touch three labials on one side or the other; the scales around the middle of the body are

Measurements of *Eumeces oshimensis* Thompson

Museum Number* Sex	C.A.S. 21610 ♂	C.A.S. 21539 ♂	C.A.S. 21565 ♀	C.A.S. 21568 ♂	C.A.S. 21613 ♀	C.A.S. 21561 ♂	C.A.S. 21585 ♂	C.A.S. 21562 ♂	C.A.S. 21580 yg.
Snout to vent	99	99	80	74	69	56	56	52	42
Tail	.....	.....	.....	11.5	.....	.....	97	.....	66
Snout to foreleg	35	37	24	25	22	20	20.4	18	16
Snout to eye	8.5	8.8	7	7	6	5.2	5.4	4.5	4
Snout to ear	24	23	15.5	15.5	14	12	12	11	9.2
Axilla to groin	52	52	44	39	35	28	28	26	22
Width of head	18	20	15	14	12	10	10	8	6.8
Length of head	22	23	14.5	16	14	11.4	11.8	9.8	8.8
Width of body	18	19	18	16	12	12	12	11	9
Foreleg	29	28	23	22	20	17	17.2	15	13
Hind leg	40	40	32	31	28	24	25	21.5	19.2
Longest toe	14.2	14	12	12	11	10	10	9	8

* All from Amamioshima.

26 in all but three specimens; two have 24, and one has 28 (if counts are made three scales farther forward the percentage with 28 increases to nearly 50 percent). The frontal touches three supraoculars on each side except in three cases, where there are two on one side only. Lamellae under the fourth toe vary between 17 and 21, 18 and 19 of most frequent occurrence.

The scales on the back of the femur are slightly enlarged, but

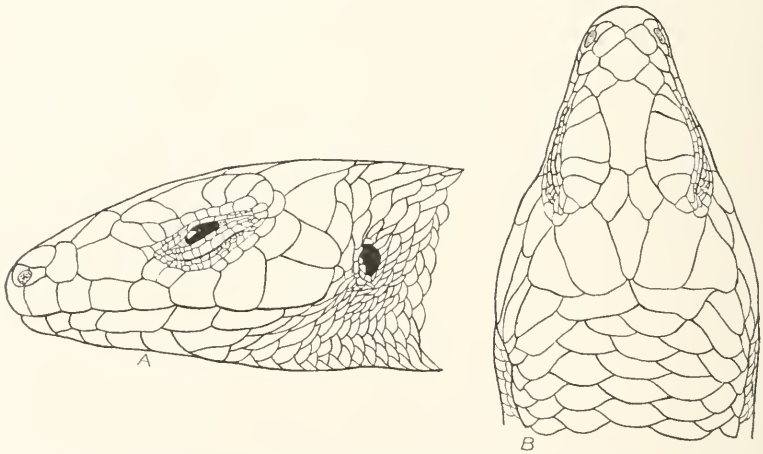

FIG. 37. *Eumeces oshimensis* Thompson. C.A.S. No. 21554; Amamioshima, Loo Choo Islands, Japan. A, lateral view of head; B, dorsal view of head. Actual head length, about 17.5 mm.; width, about 14.2 mm.

these do not form a patch nor are the scales irregular in shape. Van Denburgh notes that some of the specimens have slightly enlarged middorsals. This seems to be relatively true, due to the smaller size of the adjoining scale rows.

The variation obtaining in the specimen from Kikaigashima (*Eumeces marginatus kikaigensis* Van Denburgh) is small. Here, too, the relations of the temporals, dorsal head scales and lateral head scales are unusually constant. The upper labials are eight on one side in three specimens; in the others the usual seven are present. There is only a single pair of nuchals normally in the series of 17 specimens examined (in one specimen there are two on one side). I am at a total loss to understand Van Denburgh's statement (1912, p. 220): "One specimen has a single pair of nuchals; one has two on one side and three on the other; the others all have three pairs, the anterior larger." The larger number of specimens have 28 scale rows about the middle of the body, but the percentage is just above 60. The largest specimen from this island I have measured is a male of 87 mm. from snout to vent.

Remarks. The use of the name *oshimensis* Thompson for the form from Amamigunto is necessitated by the date on Thompson's privately printed paper dated June 25, 1912. Van Denburgh's privately printed paper (see synonymy) was not issued until July 29, 1912. Regardless of the "right" in this controversial melange Thompson's name is the earlier, unless it can be proved that the date is fictitious, a matter in which I have no opinion (see Barbour, 1917).

The separation of *oshimensis* from *marginatus* is based perhaps on relatively minor characters, but on the whole these appear as constant as characters are in the genus. Furthermore, satisfactory series are available and in the case of *oshimensis* a very large series.

However, an attempt to separate the Amamioshima specimens from those on Kikaigashima is, I believe, futile. The characters on which Van Denburgh made such a separation are of such a nature, and their variability so great, that I am of the opinion that this should not stand. Moreover, one of the chief characters given is the presence of three nuchals, a statement due to error.

Distribution. As here interpreted the species is confined to Amamigunto, comprising Amamioshima, Kikaigashima, Tokinoshima, Okinoyerabujima and Yoronjima, although at present records are confined to the two larger islands only. (See Fig. 40 for distributional map.)

Locality records:

Amamioshima (C.A.S. 73, including types of *amamiensis* and *oshimensis*) (Doederlein, 1881) (A.M.N.H. 2) (U.S.N.M. 1) (M.C.Z. 1) (A.N.S.P. 1, No. 9380)

Kikaigashima (C.A.S. 19, including types of *kikaigensis*.) (Brit. Mus. 2).

Eumeces stimsonii Thompson

(Plate 19; Figs. 38, 40)

SYNONYMY

1912. *Eumeces stimsonii* Thompson. Herp. Notices No. 2, Desc. New Spec. Rept. Batr. from the Far East, privately printed, San Francisco, June 28, 1912, p. 4 (type description; the type locality, Ishigaki Is., Loo Choo Islands; type, No. 21645, Cal. Acad. Sci., V. Kuhne Coll.); and Herp. Notices No. 3, privately printed, San Francisco, July 31, 1912, p. 4 (mentioned as an addition to the fauna of Loo Choo Archipelago).

1912. *Eumeces ishigakiensis* Van Denburgh. Advance Diagnoses of New Reptiles Amph. from Loo Choo and Formosa, privately printed, San Francisco, July 29, 1912, pp. 5, 6 (type description; type locality, Ishigaki Shima, Loo Choo Islands, Japan; V. Kuhne Coll.); and Proc. Cal. Acad. Sci., (4), III, 1908-1913 (Dec. 16, 1912), pp. 221-223 (redescription).

1917. *Eumeces stimpsonii* Barbour. Occ. Papers Mus. Zoöl. Univ. Mich., No. 44, Sept. 12, 1917, p. 2.

History. The species was collected in Ishigakijima by V. Kuhne, who obtained a large series consisting of 33 specimens. These, together with other species, were studied by Doctor Van Denburgh and the descriptions placed into manuscript previous to January, 1911. This manuscript was presented for publication on May 18, 1912, and was published on December 16, 1912. Between the time the manuscript was presented and the date of its publication, both the manuscript and the specimens were available to Surgeon J. C. Thompson, U. S. N., who published privately a series of three papers, one of which, the second, contained a description of *Eumeces stimsonii*, based on C.A.S. No. 21645 of the Ishigakijima series. Van Denburgh learned of Thompson's intention to do this, but not knowing that the descriptions were in print, extracted from his manuscript short diagnoses and printed them privately, the paper appearing July 29, 1912, a month later than the date which appears on the second Thompson paper. At the present time it seems unavailing to question the date of this latter paper, and regardless of the ethical question involved it seems that Thompson's name must be recognized, since it has a technical priority of thirty days. [See Barbour (1917) for further data on this "regrettable tangle of names."]

Diagnosis. A seven-lined species, having a median line bifurcating on the head, a dorsolateral line from the first supercilliary, a lateral line passing above the ear, and a sublateral line; scale rows

26 (rarely 24 or 28); no postnasal; one postmental; upper secondary temporal large, fan-shaped, emarginate behind; lower secondary narrow, elongate; a keeled lateral postanal scale; limbs overlapping when adpressed.

Description of the species (from the paratype series). Portion of the rostral visible above more than half the size of the frontonasal; supranasals very large, sometimes approaching the size of the prefrontals, forming a median suture; frontonasal broader than long, in contact with the anterior loreal (rarely not), and usually forming a suture with the frontal; prefrontal variable in size, usually separated, occasionally forming a median suture, the suture

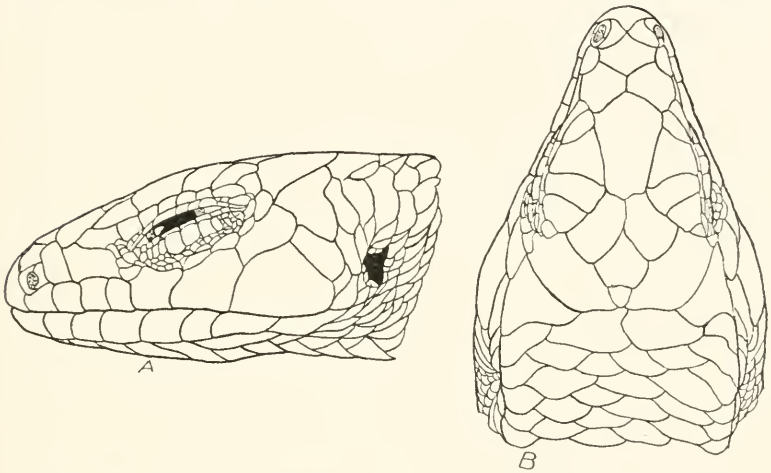

FIG. 38. *Eumeces stimsonii* Thompson. C.A.S. No. 21670; Ishigakijima. A, lateral view of head; B, dorsal view of head. Actual head length, 10 mm.; width, 11 mm.

with the frontonasal always largest; frontal elongate, about one fourth longer than its distance from the end of the snout, somewhat wider anteriorly than posteriorly, touching three supraoculars, pointed (or truncate) anteriorly; frontoparietals usually larger than the prefrontals, generally rectangular in shape, larger than, or about equal in area to, the interparietal; latter usually in contact with nuchals (one exception); parietals rather narrower than usual in the genus; a pair of nuchals widened longitudinally; two differentiated scales following the nuchals on their outer ends, one following the other, the posterior the larger, the two separated from their fellows by two body scales.

Nasal moderate, not completely segmented, the posterior part as large as part anterior to nostril; no postnasal; anterior loreal a

little higher than the posterior; latter typical, longer than high; two presuboculars; a small preocular, followed above by a smaller scale and five granules; four or five postsuboculars and two small postoculars; eight or nine superciliaries, the anterior three times as large as the posterior; primary temporal nearly rectangular, of about same width as, but shorter than, the lower secondary, with which it is in contact; lower secondary narrow, rounded posteriorly, the upper and lower sides approaching the parallel; upper secondary temporal large, fan-shaped, emarginate behind, followed by three enlarged, nearly equal sized scales, one following the other. In the adult males these scales, together with those previously mentioned following the nuchals, become much thickened and of the same general character as the head scales; tertiary temporal relatively short, entering (usually) the edge of ear, in contact with the small lobules.

Seven upper labials, the first a little larger and higher than the three succeeding labials; seventh more than once and a half the area of the sixth, followed by a superimposed pair of postlabials, the lower larger and more elongate; usually six lower labials; mental large, deep, with a much greater labial border than the rostral; a single undivided postmental, followed by three pairs of chinshields, the anterior smallest (rarely fused with the postmental); postgenial differentiated, bordered on the anterior internal side by a scale longer than wide; five upper palpebral scales join the superciliaries directly; lower eyelid with four or five enlarged plates separated from the subocular by two rows of granules (sometimes part of a third); ear surrounded by 18 to 20 scales; usually three inconspicuous ear lobules; scales parallel on sides, the median rows equal to or somewhat smaller than the lateral series; scale rows behind ear, 34 to 37; around neck, 29 to 31; about middle of body, 24 to 26 (one specimen 28); 15 to 16 about base of tail; scales in a row from parietals to above anus, 54 to 57; subcaudals much widened; a well-differentiated, keeled, lateral postanal scale; preanals eight, median pair very large, outer diminishing in size and overlapping the inner; about 14 scales around insertion of arm; a group of three or four scales of unequal size in place of the outer wrist tubercle; four enlarged, padlike tubercles on the palm, the basal lamellae of fingers also padlike; lamellar formula for fingers: 7, 11, 13, 13, 7; about 15 scales around the insertion of the hind limb; a pair of rather large padlike scales on the heel, separated by granules, each preceded by one or two enlarged tubercles or padlike scales; outer

side of foot covered with rather large, flat, imbricate scales; lamellar formula for toes: 7, 11, 15, 20, 12; basal lamellae not enlarged; terminal lamellae not tightly bound about the claws; lateral intercalated scales on fourth toe not extending beyond the basal joint.

Usually three or four pits are present on the scales on the side of the neck, more numerous in the axillary region and in the posthumeral and postfemoral regions. In the postfemoral region there is a suggestion of the enlarged and irregular condition of the scales such as one finds in *elegans*; the larger scales, however, are in regular series.

Color. Above black (in young) or brownish-black to olive (old males). In the young the pattern consists of seven cream lines, the median dividing and forming a pair of lines on the head that reunite anteriorly. The dorsolaterals begin on the first superciliary, follow the third scale row and extend about one fourth the length of the tail. The lateral line begins near the rostral, follows the labials (as a continuous line or as a series of irregular spots in older specimens), diagonally rising posteriorly passing above the ear, following the fifth scale row to the tail; the sublateral begins behind the ear and passes back along the side on the seventh scale row.

The chin, throat, breast and underside of limbs are cream; the abdomen is dull greenish or bluish-gray, the tail usually bluish. The hind leg has traces of light lines. In males the median line

Measurements of *Eumeces stimsonii* Thompson

Museum	C.A.S.	C.A.S.	C.A.S.	C.A.S.	C.A.S.	C.A.S.	C.A.S.	C.A.S.	C.A.S.
Number	21646	21670	21655	21672	21663	21674	21656	21653	21652
Sex	♂	♂	♀	♂	♂	♂	♂	♀	yg.
Snout to vent	63	60	60	58	56	54	52	49	27
Tail			89				82	79	35
Snout to eye	5.2	4.7	4.3	4.7	4.7	4.2	4	4	2.4
Snout to ear	13	13.5	10.5	11.7	12.1	11	10.5	10	6.3
Snout to foreleg	23	20	19	21.5	19	18.7	19	17.4	11.4
Axilla to groin	33	31	30	28	30	28	27	25	11.2
Width of head	10.2	10	8.4	9	10	8.3	8.2	7.2	4.4
Length of head	12	11	9.5	10.7	11.2	10	10.2	9.4	6.5
Width of body	12	11	9	10	10	9	8	9	4.8
Foreleg	15	15	16	16.2	15.2	14.8	15	14	8
Hind leg	23	23	22	23	22	21.6	20.3	21	12
Longest toe	9	8.5	8.9	8.2	8	9	8.5	8	4.4

grows dim in early middle age as does the sublateral; the dark line between the dorsolateral line and the lateral becomes a deep brown; the head becomes a yellowish-brown. The underside of the tail becomes dirty white and the upper part gray or olive. In very old males the color is nearly uniform olive, with usually some trace of the lateral brown stripe.

Variation. A total of 29 specimens have been available of the original series of 33. Van Denburgh (1912) has called attention to the fact that certain of the specimens show an incipient enlargement of certain postfemoral scales. These, however, are usually in regular rows, the scales only occasionally showing a change in shape suggestive of those in *elegans* and related species on the mainland. None show more than a single postmental and the postnasal is invariably lacking. Two anomalies occur in the supraoculars: one has the third left supraocular divided, and another has the third and fourth left supraoculars fused into a single scale. Van Denburgh gives the following data: "Scales around the body are 26 in 28 specimens, 24 in three and 28 in two." He further notes that: "In the largest specimens (snout to anus 64 mm.) the lateral lines have quite or nearly disappeared, and the temporal regions and sides of the body and neck are suffused with brick-red." This red color is not evident now, presumably having faded in the preservatives, despite the fact that the other coloration is very bright.

Remarks. It is rather futile to attempt to determine the exact relation of *stimsonii* to *Eumeces elegans*, *marginatus* and *latiscutatus*, as it seems to have pretty much the general characters of all. The change in the position of the lateral stripe, the addition of the sublateral stripe in the young and the reduction in size all speak of a long era of isolation. The presence of this species in the neighboring islands of Iromotijima, Yonakunijima and the smaller neighboring islands may be postulated, although it may be doubted that it occurs on the islands of the Miyakojima group. Stejneger (1907) mentions specimens of "*marginatus*" (Hamburg Mus. Nos. 1182 and 1900) from Iromotijima. These may be specimens of *stimsonii*, as is certainly the case with another specimen from Ishigakijima (U.S.N.M. No. 34185) listed by Stejneger as *Eumeces marginatus*. Nos. 21223 and 21224 in the collection of the American Museum of Natural History, from the "Yaeyama" islands appear to belong to *stimsonii*. Both have the sublateral line, and the lateral line passes above the ear.

It is a bit remarkable that in the 28 specimens examined only

two were females. These apparently had recently laid their eggs. One may presume that most of the females were in burrows brooding eggs.

Distribution. Known certainly only from Ishigakijima of the Yaeyama group, Riu Kiu Islands (C.A.S. 29, including the type of *stimsonii* Thompson and *ishigakiensis* Van Denburgh) (M.C.Z. 1) (U.S.N.M. 1) (A.M.N.H. 2) (Brit. Mus. N.H. 2). (See Fig. 40 for distributional map.)

Eumeces barbouri Van Denburgh

(Fig. 40, Distribution)

SYNONYMY

1912. *Eumeces barbouri* Van Denburgh. Adv. Diag. New Rept. Amph. Loo Choo Is., privately printed, July, 1912 (type description; type locality Amamioshima, Riu Kiu Islands; type No. 21545 Cal. Acad. Sci.); Van Denburgh, Proc. Cal. Acad. Sci., (4), III, 1908-1912 (Dec. 12, 1912), pp. 215, 216 (redescription of type); Barbour, Occ. Papers Mus. Zoöl. Univ. Mich., No. 44, Sept. 12, 1917, p. 4.

History. The two specimens on which the species was founded were a part of a collection made by V. Kuhne between April 20 and May 1, 1910. The preliminary diagnosis was published privately by Dr. John Van Denburgh in San Francisco July 29, 1912 (see Barbour, 1917). Later in December of the same year a detailed description was published, which is here reproduced. The type is now in the California Academy of Sciences, San Francisco; the paratype was presented to the British Museum by J. C. Thompson. As I have been unable to examine the type or cotype I include the description and discussion given by Doctor Van Denburgh.

Diagnosis. "One azygous postmental; no patch of enlarged scales on back of thigh; postnasal present; posterior loreal short, normally touching two labials; fifteen or sixteen plates under fourth toe; twenty-two scales around middle of body; young with one median and two lateral light lines; latter narrow, and separated by not less than width of two scales; lower lateral line separated from fore limb by less than the distance between the lateral lines, and running below the level of top of hind limb and top of ear."

Description of the type (California Academy of Sciences, No. 21545. "Amami O shima, Loo Choo Islands," Japan; April 20-30, 1910): "Similar to *E. latiscutatus*. Nasal small, in contact with rostral, supranasal, postnasal, and first labial plates. Anterior loreal forming sutures with postnasal, supranasal, prefrontal, posterior loreal, and second labial plates. Posterior loreal longer than high, in contact with two (right) or three (left) labials. First labial in contact with rostral, nasal, postnasal, and second labial. Frontal just separated from frontonasal, in contact with three supraoculars on each side. Parietals large, separated by interparietal. One left and two right nuchals. Upper temporal largest. Seven supralabials, the seventh largest. One azygous postmental. Scales smooth, except one behind each corner of vent; twenty-two

around middle of body; fifty in a row from parietals to line joining backs of thighs; two middorsal rows slightly enlarged. Median subcaudal row broad. No patch of enlarged scales on back of thigh. Fifteen or sixteen scutes under fourth toe. Hind limb reaching between wrist and elbow. Tail forked at point of regrowth.

"The color above is nearly uniform light brown, with a few dark brown spots at the bases of the scales posteriorly. A dark brown band extends from the temporal region to the base of the tail, and is edged above and below with lighter brown indications of the lateral light lines. The upper lateral and middorsal lines are evident on the tail. The limbs are brown, the centers of the scales being lighter. The lower surfaces are greenish white, clearer yellowish white on the chin, preanals and midcaudals.

"A young specimen is black above with two narrow lateral pale blue lines on each side, and a broader middorsal line which bifurcates on the head as in other species of the group. The tail is very bright blue.

Length to anus	66	49 mm.
Length of tail	..	90 mm.
Snout to ear	13	10 mm.
Snout to fore limb	22	28 mm.
Fore limb	19	15 mm.
Hind limb	28	22 mm.
Base of fifth to end of fourth toe	12	10 mm.

Variation. "The smaller specimen differs from the type in having the frontal in contact with the frontonasal, the second loreal touching only two labials on each side, the superposition of the first loreal, the presence of two nuchals on each side, and sixteen plates under each fourth toe. The scale counts around the body and along the back are twenty-two and fifty."

Remarks. "This lizard must be rather rare; for of eighty-one specimens of this genus taken on Amami Oshima only two are of this species, the others being *Eumeces marginatus*. *Eumeces barbouri* is practically a *Eumeces latiscutatus* with the scales around the middle of the body reduced in number to twenty-two.

"The presence in the Loo Choo Islands of a close relative of *Eumeces latiscutatus* is one of the most interesting facts brought out by these collections, since it affords, as I believe, the first definite evidence of a former land-connection between these islands and Japan proper.

"It is a pleasure to name this lizard in honor of Mr. Thomas Barbour of Harvard University."

The extremely low scale count on this derivative of the Japanese *latiscutatus* is surprising, since the form *okadae* varies from *latiscutatus* in a marked increase in the number of scale rows. Whether Van Denburgh is justified in thinking that the presence of this species affords the first definite evidence of a land connection with the mainland may be doubted. *Marginatus* itself is a species closely related to *latiscutatus* and its distribution might offer just as convincing evidence of such a connection. The surprising fact, and the one not so easily accounted for, is the presence of two such derivatives on a small island. The fact that so large a series of the *mar-*

ginatus form was obtained (79 specimens) and such a small one of *barbouri* (2 specimens), suggests a very definite habitat difference, rather than rarity of the latter form.

Distribution. Known only from two specimens from Amamioshima. (See Fig. 40 for distributional map.)

Eumeces marginatus (Hallowell)

(Plate 18; Fig. 40)

SYNONYMY

1860. *Plestiodon marginatus* Hallowell Proc. Acad. Nat. Sci. Phila., 1860, p. 492 (type description; type locality, Ousima, Japan and Loo Choo Islands; lectotype [Stejneger, 1907], U.S.N.M. No. 11713, "Loo Choo Islands" Okinawajima, W. Simpson Collector).

1887. *Eumeces marginatus* Boulenger. Cat. Lizards Brit. Mus. III, 1887, p. 371 (part.) (Nara?); Okada, Cat. Vert. Anim. Japan, 1891, p. 70 (part.); Boulenger, Ann. Mag. Nat. Hist., (6), X, Oct., 1892, p. 302 (Okinawa); Fritze, Zool. Jahrb., Syst., VII, 1894, p. 860 (part.) (Okinawa); Boettger, Jahrb. Offenb. Ver. für Naturk., 1895, p. 115 (part.) (Okinawa); Brown, Proc. Acad. Nat. Sci. Phila., Apr., 1902, p. 185 (Okinawa); Stejneger, Bull. U. S. Nat. Mus., 58, 1907, pp. 205-207, fig. 184 (head) (part.) (detailed discussion of types and a careful description); Barbour, Proc. N. Eng. Zoöl. Club, IV, Nov. 24, 1909, p. 63 (Okinawa); Van Denburgh, Proc. Cal. Acad. Sci., (4), III, (1908-'13), Dec. 16, 1912, pp. 216-217 (Okinawa); Terentjev, Copeia, No. 119, 1923, p. 76 (discredits records of the species from the Asiatic mainland).

History. The first specimens of this island species were included in the collections of Dr. W. Stimpson, the naturalist of the Rodgers North Pacific Exploring Expedition. These specimens were studied by Dr. Edward Hallowell, who (according to Stejneger, 1907, p. xviii) died before the paper was published. He mentions two cotypes, one from "Ousima," Japan (= Amamioshima), and one from Loo Choo Island (= Okinawajima). Stejneger (1907) states that the larger of the two specimens from "Ousima" is lost. He therefore designated the smaller Loo Choo specimen, now U.S.N.M. No. 11713, as the type (lectotype).

When examining specimens in the Philadelphia Academy of Sciences in 1933, I discovered a specimen of a skink belonging to the *marginatus* section of the *Fasciatus* group, in a bottle, labeled "*Eumeces fasciatus*." The container, however, had a label which showed the specimen to be from the Rodgers North Pacific Exploring Expedition, and is, I believe, the missing cotype.*

Boulenger (1887) considered the island forms from the Riu Kius and those from the large islands of Japan to be conspecific, as did Okada (1891) and Boettger (1893). Stejneger (1907) clearly defined and limited *latiscutatus* (Hallowell) to the Islands of Japan proper, and restricted the name *marginatus* to the species occurring

* The specimen is A.N.S.P. No. 9309. The measurements are: head and body, 92 mm.; tail, 74 mm.; axilla to groin, 49 mm.; snout to foreleg, 21 mm.; snout to ear, 23 mm.; head width, 20.2 mm.; head length, 21.1 mm.; foreleg, 25 mm.; hind leg, 35 mm. This specimen must be considered now as belonging to *oshimensis* Thompson.

in the Riu Kius, believing it to occur throughout the group, mentioning specimens from Ishigakijima and Iromotijima.

Van Denburgh (1912, 1912a) has essayed to break up the Riu Kiu species into several forms. The southern specimens he named *ishigakiensis*, while those of the islands to the north of Okinawa, he named *amamiensis* and *kikaigensis*, from their island habitats. Thompson (1912), anticipating the change, likewise described the two latter forms as *E. oshimensis*.

One report of the species from the mainland on the Ussuri coast by Elpatjewsky and Sabanejew has been discredited by Terentjev (1923).

Diagnosis. A typical member of the *Fasciatus* group; five light lines present, the median bifurcating on the nuchal, the branches reuniting on the snout; the dorsolateral light line arises on the first supereiliary, follows usually middle of the third scale row to middle of the tail; the lateral light line broken on labials, passes back from middle of ear and follows usually the sixth scale row. No sublateral light line. Median dorsal scale rows distinctly widened; no distinct patch of differentiated postfemoral scales; a keeled lateral postanal scale; subcaudals widened; no postnasal; a single postmental; scale rows, 26. Limbs long, overlapping when adpressed. Adult males lose practically all trace of white lines. The markings and color of young similar, save the tail is a bright blue.

Description of species (from topotypes). Portion of rostral visible above usually between one half and three fourths the size of the frontonasal; supranasals relatively large, forming a median suture, always separating the rostral from frontonasal; latter scale somewhat variable, usually about as long as wide, in contact with the frontal in practically all cases (one exception in 30), the suture often broad; prefrontals variable, usually relatively small, often of equal or smaller size than the supranasals, their sutures with frontonasal longest, the sutures with the other scales subequal, that with frontal variable; frontal slender, frequently (if not usually) more narrow than the supraocular region in its widest part, and distinctly longer than its distance from the end of the snout; frontoparietals always longer and larger than the prefrontals, always forming a median suture; interparietal always in contact with the nuchal; parietals relatively slender; normally only a single pair of nuchals, but frequently there may be two on one side, one on the other, rarely two complete pairs.

Nasal moderate, apparently only partially divided by a suture;

anterior loreal little higher than the posterior, which is much longer than high, in contact, normally, with three labials; four supraoculars, three broadly in contact with the frontal; seven to nine superciliaries (eight usually), the anterior more than double the size of the posterior; a small preocular, followed by a smaller scale and one or two granules; two small, elongate postoculars; median palpebral scales touching the superciliaries; enlarged scales on lower eyelid separated from the suboecular by one or two rows of granules; two presuboculars; four or five postsuboculars (very rarely three); anterior temporal usually rather large, in contact with both secondary temporals; upper secondary large, triangular, or fan-shaped, definitely emarginate posteriorly, usually followed by three moderately well-defined, vertically elongate scales, one following the other, which are bordered above by two scales posterior to the outer part of the nuchal, the second of these largest (in adult males these scales become thickened as do the other head scales. This pattern of posttemporal scales only a little less distinct than that of *E. elegans*); lower secondary temporal narrow, elongate, somewhat rounded posteriorly (broken in two cases); tertiary temporal small, not well differentiated. Seven upper labials, the seventh largest, but not relatively as large as the same scale in *elegans*, and consequently the difference in size between the sixth and seventh labials is not so great; the first labial is usually higher and larger than the three following; a pair of postlabials, superimposed, the lower largest, usually in contact with ear, the upper sometimes separated by one or two very small scales; two or three small auricular lobules; ear surrounded by 19 or 20 scales; usually six lower labials; mental rather large, the labial border much greater than that of rostral; usually a single postmental; three pairs of chinshields, followed by an elongate postgenial, which is bordered internally by a scale longer than wide.

Scales on body parallel, the median dorsal series usually a little wider than the two adjoining, those in posterior half of body sometimes only as large as the adjoining rows; scales in a row from parietals to a point above anus from 55 to 60, the usual numbers being 56 or 58; scales about neck behind ear, 34 to 36; constricted part of neck, 29 to 32; in axillary region, 36-38; about middle of body, 26 (one 25; one 28). The pits on the scales are usually present over the usual lateral areas; about arm and leg insertion and in posthumeral and postfemoral regions the pits are more numerous. Subcaudals wide, about 98 to tip of tail, when complete; a well-

defined, keeled, lateral, postanal scute, less distinct in females; the postfemoral scales frequently show some irregularity and enlargement suggestive of the postfemoral patch of scales in *Eumeces elegans;* about 14 scales about insertion of arm; outer wrist tubercle usually not strongly differentiated, represented by three or four small tubercular scales; palm with five or six scattered enlarged tubercles; basal lamellae of digits usually somewhat enlarged; lamellar formula for fingers: 7; 10; 12; 12; 8. About 19 scales around insertion of hind limb; four large, paired, padlike, heel tubercles separated medially by small scales; none or at most only one larger tubercle on sole. Terminal lamellae not tightly bound about toes; intercalated series of scales on outer side of fourth toe usually does not extend beyond basal phalanx. Limbs strong, well-developed, overlapping, when adpressed, about the length of the fourth toe.

Color. Young brownish or olive-black, with a median bluish white stripe from middle of tail to first nuchals, where it bifurcates, the prongs uniting on the frontonasal or, in slightly older specimens, terminating on the prefrontals; dorsolateral light stripe from first supereiliary, following the middle of the third scale row, the outer edges of adjoining scale rows often with minute bluish-white flecks; the lateral line in youngest specimen available (50 mm. snout to vent), shows four cream spots on the posterior labials in front of ear; it emerges from lower half of the ear posteriorly and follows the sixth scale row or edges of the fifth and sixth to middle of tail; tails blue in young.

Male specimens lose the median stripe when about 60 mm. snout to vent; the dorsolateral lines are distinct and the area between these and the lateral lines is a deep brown, while the dorsal surface is olive. The heads are lighter; females of this age retain the typical lines and stripes, the lateral brown stripe being very distinct. The belly is bluish-gray, but the remainder of underside is cream. Old males loose all trace of the white lines, becoming brownish-olive above with a well-defined brown lateral stripe. The heads are yellowish (probably reddish in life). In younger specimens the light lines may have dark borders and the olive color is at first in the centers of the scales. Limbs similarly colored above.

Variation. Most of the variable characters have been noted in the description. Three specimens have been found with the postmental divided (21221-21223 A.M.N.H.); a fourth is reported by Brown (1902), but whether in this form or in *oshimensis* it is impossible to say, as he does not state the source of the specimen. In

Measurements of *Eumeces marginatus* (Hallowell)

Museum..... Number..... Sex.....	A.N.S.P. 9309 ♂	M.C.Z. 7409 ♂	M.C.Z. 7409 ♀	U.S.N.M. 23893 ♂	C.A.S. 24254 ♂	C.A.S. 21639 ♂	C.A.S. 24255 ♀	C.A.S. 21640 ♂	C.A.S. 21642 yg.
Snout to vent.....	93	85	76	76	70	65	64	60	52
Tail.....	79 reg.	.....	.....	114?	.....	.....	.....	.....	102
Snout to foreleg...	21	23\	21	24	25	22.6	19.8	20	18
Snout to eye.....	7.5	6.2	5.3	5.5	5.8	5	4.6	4.4	3.5
Snout to ear.....	23	19	17	18	16	15	13	12	10.2
Axilla to groin...	49	44	43	40	37.5	34	38	32	26
Width of head....	20	15	14	14	12	11.5	9.4	10	8
Length of head....	21	16	15.5	14	14	13	12	12	10
Width of body.....	.....	18	16	15	13	11.6	15	11.4	10
Foreleg.....	25*	22	21	22	19	19	17.6	16.4	15
Hind leg.....	36*	29	29	32	29	30	26	25	21
Longest toe.....	14	12	11	12	11	11	10	10	9

* Claw missing. All specimens from Okinawa.

one specimen, No. 21222 A.M.N.H., the frontonasal is fused with the left prefrontal. The frontonasal varies markedly in size, and as it is larger or smaller, the prefrontals are smaller or larger. When of small size the frontonasal loses contact with the anterior loreal.

The color variation already noted is typical. However, certain males tend to retain the median and other light stripes until a greater size is reached. The old males have reddish heads. (One female examined has six eggs, three in each oviduct.)

Remarks. This form may be distinguished from *oshimensis* by the widened median scales, the greater length of the white lines on the tail (in *oshimensis* they do not extend one fourth the length; in *marginatus*, one half to three fourths the length); and by the fact that the dorsolateral line passes along the middle of the third scale row instead of along the edges of the third and fourth. The amount of differentiation between these two forms is less than between *marginatus* and *stimsonii*.

Distribution. Apparently confined to Okinawajima and possibly also to the near-by islands, Iheyajima, Kumeshima, Iyeshima and Kerumashima, although no records are available for any except the first mentioned island. (See Fig. 40 for distributional map.)

Locality records:

Okinawa: (U.S.N.M. 7, including type; "Loo Choo Island," April, 1855, Cat. No. 11713; Dr. W. Stimpson Coll.) (M.C.Z. 3, A. Owston Coll.) (A.M.N.H. 5, M. Oshima Coll.); Nago (Brit. Mus. 4, "Great Loo Choo Is.," Holst Coll.) (Fritze, 1894) (Brown, 1902) (C.A.S. 11).

Eumeces okadae (Stejneger)

(Plate 19, Figs. 1 and 2; Fig. 40)

SYNONYMY

1906. *Eumeces latiscutatus okadae* Stejneger. Bull. U. S. Nat. Mus., No. 58, 1906, pp. 200-202, fig. 181 (type description; type locality Miyakeshima, Idzu Islands, Japan; type, U.S.N.M. No. 23891; also Niishima); Van Denburgh, Proc. Cal. Acad. Sci., (4), III, 1908-'13 (Dec. 16, 1912), p. 214.

History. The first specimens of this species appear to have been collected by Okada in the Idzu Islands, May 3, 1887, but were not described until 1906 when Stejneger's monumental work on Japanese herpetology appeared. Stejneger had nine specimens, from two of the islands, the type being U.S.N.M. 23891 from Miyakeshima. It was named for the collector. Since that time apparently no further specimens have reached American or European collections and the only other literature reference merely recounts characters of a specimen from Niishima, one of the original series studied by Stejneger.

Diagnosis. A species related to *Eumeces latiscutatus*, having a five-lined pattern, the median not bifurcating on the head, the pattern early becoming very dim or obsolete. Scale rows about middle of body, 28; a large postnasal, which usually separates the anterior loreal from the labials; postmental single; a keeled postanal scale in males, less distinct in females; seven, rarely eight, upper labials, median dorsal series somewhat widened.

Description of the type (U.S.N.M. No. 23891, Miyakeshima, Idzu Islands, Japan. May 3, 1887, by N. Okada). Rostral high, the part visible above somewhat less than the area of the frontonasal; supranasals very large, probably equal in area to the prefrontals, forming a median suture; frontonasal as broad as long, touching the anterior loreals, forming a broad suture with the frontal; prefrontals small, widely separated medially; frontal elongate, longer than its distance to the end of the snout, touching three supraoculars; frontoparietals very much larger than the prefrontals, forming a median suture less than half their length; interparietal slender, not enclosed by the large parietals; one pair of nuchals; nasal moderate; a small, well-defined postnasal; anterior loreal high, much higher than the posterior, narrow; second short, only little longer than high; four supraoculars, three touching frontal; eight-nine superciliaries, the anterior three or more times as large as the second or last; two presuboculars, four-five postsuboculars; two small postoculars and one preocular, with a small scute above followed by a series of granules; only four median palpebral scales

touching the superciliaries; five or six enlarged scales on the lower eyelid, these separated from the subocular by three rows of granules; primary temporal rather large, rectangular; upper secondary very large, triangular, its posterior border sinuous; the lower secondary temporal narrow, elongate, the upper edge slightly curving but nearly parallel with lower edge, posterior edge slightly rounded; tertiary temporal elongate, separated from the nuchal by a small scale; seven upper labials, the anterior slightly higher and equally as large as, or larger than, the three succeeding scales; seventh labial largest, widely separated from the upper secondary temporal; two superimposed postlabials; six lower labials; mental large, wide, its labial border much greater than that of the rostral; a single postmental, followed by three pairs of chinshields, the last followed by a large, strongly differentiated postgenial, which is bordered on anterior inner side by a narrow, elongate scale; ear opening large, surrounded by about 21 scales, the three anterior lobules very minute; scales of the median series of the back slightly wider than adjoining scales and distinctly wider than the lateral series; 56 scales from parietals to above anus; 36 rows about neck behind ear; 32 rows about narrow part of the neck; 43 rows in the axillary region; 30 scale rows about middle of body; 20 rows about base of tail. Tail regenerated; median preanals very large, the laterals, two or three on each side, diminishing in size, the outer overlapping the inner; lateral postanal scale bearing a well-developed keel.

Well-developed area of axillary scales, with a few at the upper anterior insertion of the limb; two or three granular series behind insertion of hind limb; about 17 scales around insertion of forelimb; outer scale on the wrist rounded, padlike; palm with a triangular area of six enlarged, rounded, padlike scales, with other smaller ones; basal lamellae on toes padlike; lamellar formula for fingers: 6, 13; 13; 11; 7. About 24 scales around insertion of leg; heel with several enlarged scutes, only part of which are padlike; two hundred padlike scales on outer mid-portion of sole; rest of sole covered with small granules. Lamellar formula for toes: 7; 12; 16; 19; 12. Subcaudals widened.

Color (in alcohol). Above nearly uniform dark olive, the head very little lighter; a very obscure brown lateral band visible from the temporal region to groin along each side and bordered above by a very slightly lighter shade of olive than back (visible only in liquid); below grayish, the chin, throat, underside of limbs lighter, nearly cream; underside of tail also light for a part of its length.

Measurements of the types and partypes of *Eumeces okadae* (Stejneger)

Museum Number Sex	U.S.N.M. 23895 ♀	Type* U.S.N.M. 23891 ♂	U.S.N.M. 36532 ♂	C.A.S. 27229 ♂	U.S.N.M. 36533 ♀	U.S.N.M. 36534 ♀	U.S.N.M. 23892 ♂	U.S.N.M. 23896 yg.
Snout to vent	79	70	70	70	61	58	57	41
Tail	.....	reg.	.....	.....	105	reg.	109	75
Snout to eye	.....	6	.....	6.3	.....	5.1	5	.....
Snout to ear	.....	14.8	.....	15.5	.....	13	12.6	.....
Snout to foreleg	26	24	23	23	21	21	21	15
Axilla to groin	45	34.2	40	35	30	29	30	21
Width of body	13	13	13	14	12.4	12	10	8
Width of head	12	11	12	13	11	9	9	7
Length of head	12	13	13	13.8	12	11.5	11.8	8
Foreleg	22	21	23	21	19.5	20	17	12
Hind leg	31	29	30	28.5	26	28	27	17.5
Longest toe	12	11.5	12	12	.....	10	10	7
Postanal width	10	9.2	9	9	7	6	5.7	5

* The dimensions given in the type description are those of the specimen here listed as 36534. Nos. 23895, 36532, 36533, 23896, 27229, Nishima; Nos. 23891, 36534, 23892, Miyakeshima.

Variation. The three specimens from the type locality agree in the absence of lines on the back, the presence of a dim, brown, lateral line and the presence of thirty scale rows.

The specimens from the island of Niishima, Idzu Islands, Japan, differ strikingly in color and markings and appear to approach more closely their large-island relative, *Eumeces latiscutatus*. The dorsolateral lines are narrower and the median line appears to stop at the interparietal, not forming the typical bifurcating line evident in all the young specimens of the typical *latiscutatus*. (The youngest specimen, 42 mm., has only a suggestion of lines on the snout.) The typical five lines are retained quite clearly in a specimen (U.S.N.M. No. 23895 ♀) 79 mm. snout to vent. In the largest male, 70 mm. snout to vent, the five lines are still rather clearly visible, while the head has become buff.

The postnasal appears to be normally present, and the lower part of the anterior loreal is missing or fused with the postnasal or the posterior loreal, and only rarely is the anterior loreal in contact with labials. In all the Niishima specimens, the anterior loreal is divided into two regular scales. A second small postnasal is present on the left side in No. 36533; in No. 23895, the anterior loreal is fused with the prefrontal.

In the specimens from Miyakeshima, the postnasal is typically present in two specimens; in the third it is wanting or fused with the lower half of the anterior loreal.

The normal number of upper labials is seven, but one specimen has eight on the left side only. The number of scale rows is 28 in five specimens, 30 in four. The scales in a row from parietals to above anus vary between 56 and 58. The lower number occurs three times, the higher four times. The superciliaries are 8-8 except in two specimens, one having 7-7, the other 8-9. The frontonasal usually is about as long as broad or slightly broader, in contact with the anterior loreal. The frontonasal is in contact with the frontal in all specimens examined. Three supraoculars touch the frontal in all cases. The postsuboculars are either four or five, four being of most frequent occurrence. The limbs are strong, well-developed, overlapping widely when adpressed in all specimens.

Remarks. My reason for recognition of this form as a distinct species from *Eumeces latiscutatus* is based on the following characters: an average of 3.6 more scale rows; an average of three more scales in the distance between parietals to a point above anus; the reduction of the anterior loreal to a small scale widely separated

from the labials, and the consequent increase in size of the posterior loreal. The color pattern has been modified and the bifurcating lines on the head appear to be wanting in the very young, the median line not even reaching the nuchals in a specimen 41 mm. in snout to vent measurement.

That the species is derived from *latiscutatus* stock cannot be doubted, but the period of isolation from the mainland form appears to have been as long as that which brought about the related species, *marginatus,* in the Riu Kius.

The Idzu archipelago stretches to the south of Honshu, the largest Japanese island, a distance of about 180 miles. Whether the species reaches the outermost islands of Hachijo, Awoga and Bayonaise is not known, but if so it would not be surprising to find forms that would warrant subspecific designation. I have already noted the differences between specimens from Niishima and Miyakeshima.

Distribution. Known only from Idzu archipelago. (See Fig. 40 for distributional map.)

Miyakeshima: (U.S.N.M. 3, including type) (Science college Tokyo 1).
Niishima: (U.S.N.M. 4) (C.A.S. 1).

Eumeces latiscutatus (Hallowell)

(Pl. 21; Figs. 39, 40)

SYNONYMY

1838. *Scincus quinquclineatus* Schlegel. Fauna Japon., Rept., 1838, pp. 99, 139, Saurii et Batr., pl. 1, figs. 1-4b (non-Linnaeus).
1839. *Plestiodon quinquelineatus* Duméril and Bibron. Erp. Gén., V, 1839, p. 70 (part.); Gray, Cat. Liz. Brit. Mus., 1845, p. 91 (part.); Bleeker, Naturk. Tijdschr. Nederl. Ind., XVI, 1858, p. 204 (Japan).
1860. *Plestiodon latiscutatus* Hallowell. Proc. Acad. Nat. Sci. Phila., 1860, p. 496 (type description; type locality Simoda, Japan. Coll. Rodgers, N. Pacific Explor. Exped.).
1864. *Eumeces* (*Plestiodon*) *quinquelincatus* var. *Japonicus* Peters. Mon. Ber. Berlin Acad. Wiss., 1864, p. 57 (type description; type locality Nagasaki; von Martens collector); Martens, Preuss. Exped. Ost.-Asien, Zool., I, 1876, p. 376 (Nagasaki).
1878. *Eumeces* (*Plestiodon*) *japonicus* Boettger. Offenb. Ver. Naturk., 17-18 Ber. Mitth., 1878, p. 4 (Japan).
1879. *Eumeces japonicus* Bocourt. Miss. Sci. Mexique, Rept., Livr. 6, 1879, p. 423.
1880. *Eumeces quinquelincatus* Hilgendorf. Sitz. Ber. Ges. Naturf. Freunde Berlin, 1880, p. 113; Fritze, Mitth. Deutsch. Ges. Ost.-Asiens, V, 1891, p. 299 (Yezo).
1887. *Eumeces marginatus* Boulenger. Cat. Liz. Brit. Mus., III, 1887, p. 371 (part.) (description; "Miyanoschita" and Nikko) (non Hallowell); Okada, Cat. Vert. Jap., 1891, p. 70 (part.) (Tokyo, Hakone, Nikko, Aevaji, Surva.); Boettger, Kat. Rept. Mus. Senckenb., 1, 1893, p. III (part.) (Nikko, Yezo); Fritze, Zool. Jahrb. Syst., VII, 1894, p. 860 (part.) (Hondo; Yezo.).
1907. *Eumeces latiscutatus* Stejneger. Bull. U. S. Nat. Mus., 58, pp. 195-200, 1907, pl. XV, figs. 1, 2, 3, and text figs. 179, 180; Barbour, Proc. N. England Zoöl. Club, IV, Nov. 24, 1909, p. 63 (Yokohama); Van Denburgh, Proc. Cal. Acad. Sci., (4), III, 1908-'13, (1912), pp. 213, 214 (Kobe Hondo, and Kagoshima, Kinsin); Hatta, Zool. Anz., XLIII, Nov. 4, 1913, p. 32 (Hokkaido); Terentjev, Copeia, June 16, 1930, No. 119, p. 76; Nikolski, Faun. Ross., Petrograd, I, 1915, p. 508 (doubts identification

of lizards collected at Imperator on mainland); Pavlov, Pub. Musee Hoang ho Pai ho, No. 12, 1932, p. 8 (Kanson, Koankia ho; doubtful).

?1931. *Eumeces latisculatus* (*sic*) Tchang. Bull. Fan Mem. Inst. Biol., II, Dec., 1931, pp. 274, 275 (reports from Peiping; apparently wrong locality data or error of identification).

History. The collections made in Japan by Buerger and Von Siebold reached the Leiden Museum, and furnished the material upon which Schlegel and Temminck based their Fauna Japonica. The specimens of this species were regarded as identical with Linnaeus' *Lacerta quinquelineata*. Schlegel writes, after comparing these with specimens of a skink from Tennessee: "L'examen d'un si grande nombre d'individus m'a demontré qu'il n'existe pas la moindre différence entre ces animaux, recueillis sur deux points du globe assez distants, l'un de l'autre quoique situés a-peu-pres sous le même parallèle."

Schlegel's account contains considerable detail regarding the color evolution from juveniles to old adults, together with data on habits and habitats. He gives the Japanese name, *awo-to kague*. Subsequent accounts persisted in referring the Japanese skink to the American species until 1860, when Hallowell discussed this matter after examining specimens brought back by the Rodger's North Pacific Exploring Expedition. He concluded that the Japanese form was different and proposed the name *Plestiodon latiscutatus*.

Peters, in 1865, apparently independently arrived at this same conclusion and suggested the varietal name *japonicus*, after an examination of specimens brought from Japan by Doctor von Martens. No further account of particular import was made until that of Boulenger (1887) when he united Hallowell's *latiscutatus*, and *marginatus* under the latter name. In 1906 Stejneger, in his monograph on the Herpetology of Japan, reviewed the literature, and again separated the two forms. With the aid of Dr. W. Stimpson's field catalogue he fixes the type locality as Simoda, Japan. Stejneger pointed out the salient characters which separate the Asiatic from the American forms, and commented on the value of the temporals as diagnostic characters.

Certain records report the occurrence of this species on the Asiatic mainland, but doubt has been cast on these records, by Nikolski (1915) and Stejneger (1907). Recently Terentjev (1923) examined presumed Asiatic specimens in the Zoölogical Museum of Moscow, and pronounced them as being *latiscutatus*. Stejneger (1926) still questions the identification, offering as a suggestion

that the specimens are in reality *E. pekinensis* (=*xanthi*), which is the most northern of the five-lined skinks known to occur on the mainland, but admitting the possibility of accidental introduction.

Diagnosis. A medium-sized species of the *Fasciatus* group, having in the young a typical black ground color with a narrow median white line extending from the proximal half of the tail to the interparietal, where it bifurcates, the branches running forward and reuniting on the frontonasal or supranasals. Dorsolateral line from first supraocular to midway of the tail, following the middle of the third scale row; labials spotted; a lateral line from the middle of the ear to tail, along the sixth scale row. Tail blue. Adult males become olive, losing stripes. Normally a single postmental; a postnasal; upper secondary temporal largest, wedge-shaped, emarginate behind; lower secondary narrow, elongate, the sides often nearly parallel. Normally 24 or 26 scale rows about the body.

Description. A medium-sized species. The part of the rostral appearing above smaller than the frontonasal, rarely equal; supranasals smaller than the prefrontals, in contact normally (one exception with a small intercalated scale between them), usually smaller than the prefrontals; frontonasal somewhat variable in size, in contact with or separated from the frontal, normally in contact with the loreal (rarely not); prefrontals somewhat variable in size, in contact or separated; frontal normally distinctly longer than its distance from the end of the snout, in contact with three supraoculars; four supraoculars; frontoparietals larger than the prefrontals, in contact medially; interparietal moderate, sometimes approaching the area of a frontoparietal; usually a single pair of nuchals (rarely more); nasal moderate, apparently divided by a suture; a postnasal normally present (very rarely absent), small or larger, very often so large as to separate the anterior loreal from the labials (or may be regarded as absent and the anterior loreal split transversely); anterior loreal frequently small, and separated widely from the labials, or touching the labials, much higher than wide, very much higher than posterior loreal, which is usually relatively short in proportion to its width and in contact with two upper labials; eight or nine superciliaries, the anterior more than double the size of the most posterior; a very small preocular, followed by two or three granules; two small postoculars; median palpebral scales in contact with the superciliaries; lower eyelid with enlarged scales separated from the subocular by three rows of granules.

Two presuboculars, and four (normally) postsuboculars; primary temporal relatively large, often approaching area of lower secondary, which is elongate, somewhat wider posteriorly than anteriorly, or the upper and lower side approaching a parallel; upper secondary very large, wedge-shaped, slightly emarginate behind; tertiary temporal usually small, poorly differentiated; scales following the superior secondary temporal and nuchals are not strongly differentiated in males as in the Riu Kiu island forms, but approach the same general relationship. Upper labials normally seven, the last greatly enlarged, the first usually scarcely larger than the three succeeding scales; a pair of postlabials, superimposed, separate the seventh labial from the auricular opening; two or three auricular

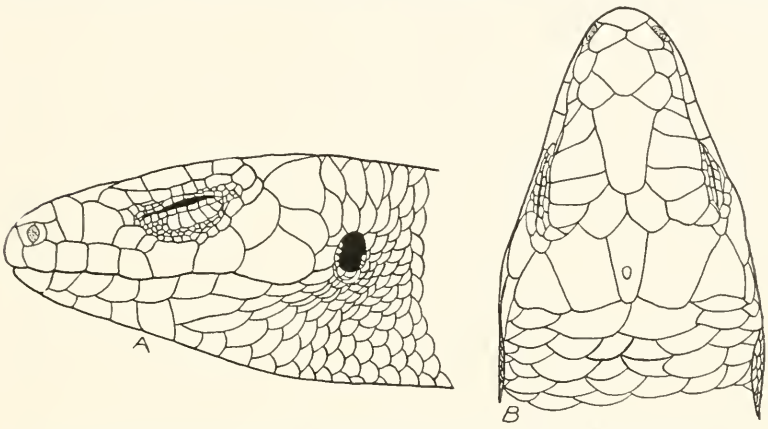

FIG. 39. *Eumeces latiscutatus* (Hallowell). Stanford U. No. 5629; Wakamura, Japan. A, lateral view of head; B, dorsal view of head.

lobules, small, inconspicuous; mental with a slightly longer labial border than the rostral; one postmental; three pairs of chinshields; a long postgenial bordered internally by scales longer than wide; usually six lower labials; 18 to 20 scales about ear; scale rows on sides parallel, the median dorsal rows slightly wider (rarely very distinctly wider) than the adjoining rows; scales around neck behind ear, about 30; about constricted portion of neck, 26-29; in axillary region, 35-39; about middle of body, 26-28; scales from parietals to above anus, 53-57. Pits present on part of lateral scales, growing dim or obsolete in adults. Subcaudals widened; usually six preanals, the median pair much enlarged, the lateral diminishing in size, the outer scales overlapping inner; a well-differentiated, lateral, keeled, postanal scute; a few granular scales in axilla, none or but a single row posterior to the insertion of femur.

About fourteen scales around insertion of forearm; usually two, occasionally three, outer wrist tubercles; five or six large padlike tubercles on the palm. Lamellar formula for fingers: 6; 8; 10, 11; 8. The basal lamellae of toes usually enlarged. About 18 scales around insertion of the hind limb; usually two pairs of padlike heel plates, separated medially; sole usually with only one or two larger tubercular scales; lamellar formula for toes: 6; 9; 14; 17; 11. Intercalated row of scales on fourth toe not extending half way on the basal phalanx; terminal lamellae not tightly bound about claw.

Color (in alcohol). Young, black or brownish-black, with five longitudinal white lines (see diagnosis for detail). This coloration in males grows lighter brown or olive, and the lines gradually disappear, the area between the dorsolateral and the lateral lines becoming a deep brown, forming a conspicuous lateral stripe. Adult males may be nearly uniform brown or olive above and the lateral dark stripe remains distinct. The heads widen and the color is yellow-brown (reddish-brown in life). Females tend to retain the general pattern of juvenile coloration, save that the ground color becomes lighter, usually brownish, or olive, with darker edges on the scales; the blue of the tail is lost early.

Variation. As is typical of members of the genus, certain characters are variable. Thus, the interparietals vary in size in proportion to the variation in size of the frontonasal. When large, the

Measurements of *Eumeces latiscutatus* (Hallowell)

Museum..... Number*..... Sex.....	C.A.S. 33032 ♂	C.A.S. 33048 ♂	C.A.S. 26133 ♀	C.A.S. 24274 ♂	C.A.S. 24276 ♂	C.A.S. 35929 ♂	C.A.S. 24275 ♀	C.A.S. 33050 yg.	C.A.S. 35921 yg.	C.A.S. 26128 yg.
Snout to vent.....	80	76	73	72	65	62	59	50	46	32
Tail.....	reg.	.....	.....	.....	125	.....	98	80	78	57
Snout to foreleg.....	25	24	23	25	22	20.4	19.8	17.6	16	13
Snout to eye.....	6.3	6	5	5.6	5	4.9	4.5	4.2	4	3
Snout to ear.....	17	17	13	15	14	14	11	12	11	8.2
Axilla to groin.....	42	40	42.4	38	36	33	35	25	20	16
Width of head.....	14	13	10.4	12	11	11	8	8	7	5.5
Length of head.....	16	15.8	13.3	15	14	13	11	9	8.5	7.3
Foreleg.....	23.5	21	19	21	20	20	17	15.3	15	10
Hind leg.....	31	31	27	28	27	28	25	20	18	14
Longest toe.....	10.5	12	9.6	.....	11	11	10	8	7	6

* Nos. 24274-24276, 35921, Kagoshima, Japan; 33048, 33050, Miyazo; 33032, Kobe; 26133, 26128, Ikishima Is.; 35929, Sakurajima Is.

two prefrontal scales form a median suture. This condition occurs 32 times in 50 specimens. Two of these are anomalous, one having a prefrontal joined with the frontonasal, the other having the frontonasal segmented, leaving a moiety inserted between the prefrontals and leaving them in contact at a single minute point. I have mentioned above details regarding the postnasal. It would appear that the segmentation of the loreal (the postnasal fusing with the lower part) is most frequent in specimens from Hondo. In a series from Kobe, five of the twelve have the anterior loreal widely separated from the labials; a series from Miyazo has five out of six so arranged. Doctor Stejneger (1907) remarks on the variation that occurs in a series of specimens from Fujiyama and notes five lacking a postnasal.

The usual number of scale rows is 26. I have counts on 68 specimens. The number 26 occurs 41 times; 24 occurs 19 times. Most of the specimens having a count of 26, if counted a few scales farther forward, have 28, those with 24 may have either 26 or 28, so counted. The intercalated axillary series should normally terminate before a distance equal to the length of the arm is reached.

Remarks. The general uniformity of this species and the lack of fixed variation on the several Japanese islands bespeaks no great degree of isolation as regards time; or, the closeness of the various islands still permits an exchange of specimens.

The species does not appear to be uncommon. I have collected it on the hills about Nagasaki and on the road between Nagasaki and Moji on the island of Kyushu. Here, the lizards were seen in considerable numbers sunning themselves in bright sunlight, which had made its appearance after a period of four cold, rainy days. The lizards would lie motionless on the rocks until one approached; then they would dart into a crevice in the rock walls. Being ill-equipped for collecting, only a few specimens were obtained.

Distribution. The species appears to occur on the southern islands Kyushu, Shukoku and Hondo (at least in the southern part of the latter island), with equal frequency. Stejneger (1907) has pointed out the lack of records from the northern half of the island. A few records occur for the island of Hokkaido. The records for the Asiatic mainland must be verified before they are to be accepted. Those of Hokkaido are not questioned by Okada (1933) in his distributional studies of Japanese lizards.

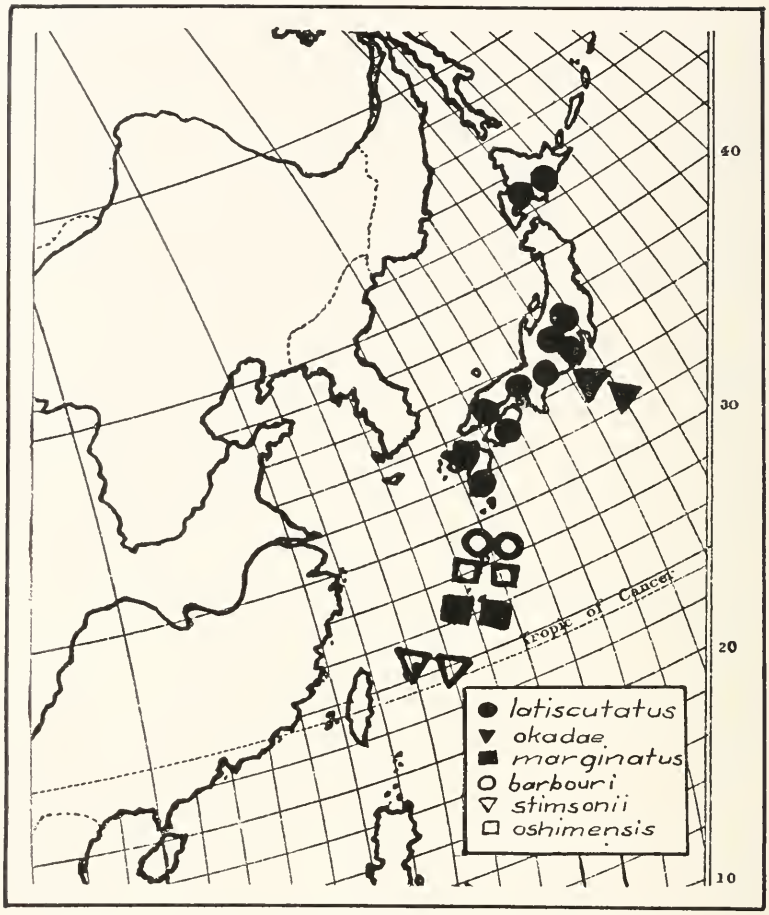

FIG. 40. Distribution of island species of the *Fasciatus* group, in Eastern Asia.

Locality records:

JAPAN: (Boettger, 1878) (U.S.N.M. 5) (Brit. Mus. 5) (A.M.N.H. 2) (Basle 6).

Kyushu: Satsuma Prov.: Kagoshima (C.A.S. 7); Yamagawa (U.S.N.M. 6). Hizen Prov.: Nagasaki (Peters, 1865, type locality of *japonicus*) (Martens, 1876) (Stanford 1). Hyuga Prov.: Miyazaki (U.S.N.M. 1).

Shikoku: Tosa Prov.: Kochi (U.S.N.M. 9).

Hondo (*Nippon*): Idzu Prov.: Simoda (Hallowell, 1860; type locality; type lost). Kanagawa Pref.: Yokohama (M.C.Z. 2) (U.S.N.M. 2) (Basle 3). Suruga Prov.: Mt. Fujiyama (U.S.N.M. 21). Settsu Prov.: Kobe (C.A.S. 12). Sagami Prov.: Miya-noshita (Brit. Mus. 6); Hakone (Okada, 1891). Tochigi Pref.: Nikko (Brit. Mus. 6). "Musashi Tokyo Fu": Tokyo (Okada, 1891). Kawachi Prov.: Kiyotaki (Stejneger, 1907). Kii Prov.: Wakamura (Stanford 6). Osaka Prov.: Yodo (Stanford 1).

Yamato: Koriyama (U.S.N.M. 1).
Awaji: Awaji Prov.: (Okada, 1891).
Hokkaido (Yezo): (Fritze, 1891) (Hatta, 1913) (Boettger, 1893) (Stejneger, 1907).
Doubtful Chinese Records: (Nikolski, 1915) (Sun, 1926) (Gee, 1930) (Tchung, 1931) (Pavlov, 1932) (Terentjev, 1923).

BREVILINEATUS GROUP

Three small species are associated in this group. They occur in northern Mexico, and in southern United States in the states of Texas, New Mexico and Arizona.

The group may be characterized as follows: skinks of medium size; small median preanals overlapped by smaller outer preanal scales; the subcaudal series only slightly widened; the median dorsal white line is either short or long, bifurcating on the nuchals and extending a greater or lesser distance on neck or completely wanting in old adults; dorsolateral and lateral light lines present with a well-defined brown lateral stripe between them, their length varying in the four species; labials seven; postmental one (rarely two in *tegragrammus*); no postnasal; scale rows 24-28; interparietal enclosed or not; postgenial bordered on its inner edge by a scale longer than wide; tails in young azure.

KEY TO THE SPECIES OF THE BREVILINEATUS GROUP

A. Parietals enclose the interparietal; scale rows usually 28; lateral brown stripe variable in width; postnasal variable, present or absent, usually absent in Arizona specimens; an elongate postlabial follows the seventh labial which is often no larger than sixth labial. (Arizona, New Mexico and northwestern Mexico).
Eumeces callicephalus Bocourt, p. 290

AA. Parietals not enclosing the interparietal.
B. Scale rows 26-28, usually the first number much more frequent; nuchals two (rarely three); dorsolateral and lateral light lines with lateral brown stripe, rarely extending more than a half the length of body and often not this distance; median line often scarcely discernible behind the point of bifurcation. (Southern Texas and northern Mexico).....*Eumeces brevilineatus* Cope, p. 283
BB. Scale rows, usually 28; nuchals, usually three pairs; seventh labial separated from ear by two postlabials or two superimposed postlabials; bifurcating lines on the head are never joined posteriorly and no median line present in young; dorsolateral and lateral lines present, enclosing a broad, brown stripe; all lines extending entire length of body; lines obscured in old adults. (Southern Texas and northeastern Mexico)..*Eumeces tetragrammus* (Baird), p. 298

Eumeces brevilineatus Cope

(Plate 22; Figs. 41, 42, 43)

SYNONYMY

1880. *Eumeces brevilineatus* Cope. Bull. U. S. Nat. Mus., No. 17, 1880, pp. 18-19, 44, 46 (type description; type locality Helotes, Bexar Co., Texas, G. W. Marnock, collector—also, Fort Concho, Texas); Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 376 (Texas); and Proc. Zoöl. Soc. London, 1890, pp. 77, 85; Cope, Ann. Rept. U. S. Nat. Mus., 1898, (1900), pp. 664-665, fig. 137 (redescription and comparison with *tetragrammus* and *anthracinus*); Brown, Proc. Acad. Nat. Sci. Phila., 1903, p. 553 (range restricted

to Texas district); Bailey, North Amer. Fauna, No. 25, 1905, p. 45; Strecker, Proc. Biol. Soc. Wash., XXI, 1908, p. 169 (Burnet Co., Texas); and Baylor Uni. Bull., XII, No. 1, 1909, pp. 5, 6 (Burnet and Brewster counties; gives data on habits and color); Ditmars, The Reptile Book, 1915, p. 200; Stejneger and Barbour, Check List N. Amer. Amph. Rept., 2d Ed., 1923, p. 75; Strecker, Cont. Baylor Uni. Mus., No. 6, 1926; Ortenburger, Uni. of Okla. Bull., Proc. Okla. Acad. Sci., Vol. VI, pt. 1, 1926, p. 95 (Caddo Co., Okla.); Strecker and Williams, Cont. Baylor U. Mus., No. 12, 1927, p. 14 (Hays, Bexar, Comal, Kendall, Burnet and Travis counties, Texas); Strecker, Cont. Baylor Uni. Mus., No. 16, 1928, pp. 1-21 (common name); *idem*, No. 23, 1930, pp. 10-11 (Austin, Texas); Stejneger and Barbour, Check List N. Amer. Amph. Rept., 1933, p. 80.

1917. *Plestiodon brevilineatus*, Stejneger and Barbour. Check List N. Amer. Amph. Rept., 1917, p. 69; Strecker, Bull. No. 4, Sci. Soc. San Antonio, 1922, p. 22 (Bexar county records).

History. The original discovery of this species was made by Mr. G. W. Marnock at his farm on the eastern edge of the Edwards plateau region, near Helotes, twenty miles northwest of San Antonio, Tex. Specimens were sent to the National Museum, which Cope described in 1880, two of the cotypes being still at the National Museum (No. 10159) and two in the collection of the Academy of Natural Sciences of Philadelphia.

At the time the species was described specimens were in the National Museum from Fort Concho (across the river from San Angelo, Tex.), collected by Mr. Boll, and these specimens were likewise divided between the two institutions. Two specimens collected by Geo. Stolley were sent to the Museum of Comparative Zoölogy at about this time.

Within the past few years a considerable number of specimens has been collected. Seven specimens from San Marcos and San Antonio are in the American Museum of Natural History; eight from Brewster and Jeff Davis counties are at the Museum at the University of Michigan; three from various localities in the Field Museum, Chicago, and 24 in the Kansas University Collection collected by myself in various parts of Texas. The first record for a specimen collected in Mexico is one taken by Hobart Smith and myself in Nuevo León in 1932.

Since no single type was designated of the four cotypes, I shall designate the specimen (U.S.N.M. No. 10159) measuring 59 mm. snout to vent, tail length 66 mm. (incomplete) as the lectotype. The types are in fair condition, showing the typical coloration, in spite of being somewhat shrunken.

Diagnosis. A medium-sized species, characterized by an olive coloration with dorsolateral cream lines beginning on the anterior supraocular and continuing along the third, and later the fourth scale rows, a short distance on the back; a lateral line beginning

near or on the first labial and passing along the side of head and body a similar distance. On the side of the head and anterior part of the body is a brown stripe which extends as far as the cream lines. A pair of curving lines begin on the rostral, and pass back following the edges of the frontal, to unite on the first nuchal (or may fail to unite in older specimens). Posterior to the terminations of the lateral and dorsolateral lines, the sides are uniformly of the same shade as the back. One postmental; no postnasal; seven upper labials, the sixth or seventh largest or of equal size; limbs touch in young when adpressed; separated in adults. Scale rows about middle of body 26 or 28; subcaudals not or only slightly enlarged; median preanals relatively small.

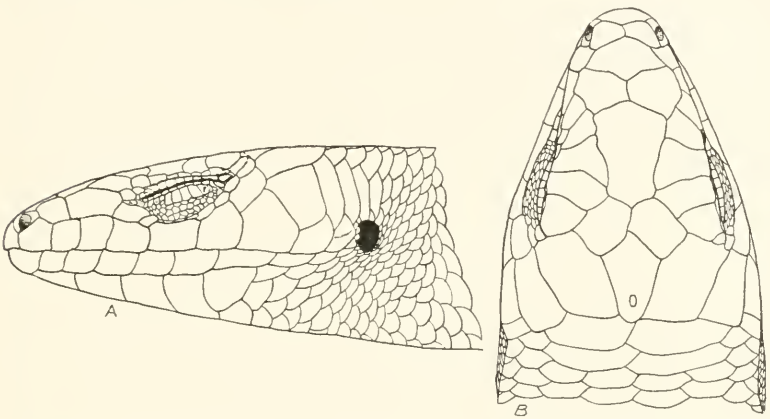

Fig. 41. *Eumeces brevilineatus* Cope. K.U. No. 7744, topotype; Helotes, Texas. A, lateral view of head; B, dorsal view of head. Actual head length, 9.4 mm.; width, 8.6 mm.

Description of the species (drawn from topotypes). Portion of the rostral visible above equal to more than half the area of the frontonasal; supranasals forming a median suture; frontonasal broader than long, touching the anterior loreal; prefrontals forming a very small median suture, and forming sutures with the frontonasal, frontal, second loreal, first superciliary, first supraocular and first loreal, the length of the sutures in the order named. Frontal angular anteriorly (greater than a right angle), very obtusely angular posteriorly or slightly lobulate, much longer than its distance from the end of the snout; frontoparietals as large as or larger than the prefrontals, forming an elongate median suture; interparietal in contact with nuchals, about size of a frontoparietal.

Parietals normal, the posterior and lateral edge curved or slightly angular, scales not in contact with each other; nasal small, divided,

the anterior part equal to posterior part with nostril; anterior loreal a little higher than wide, very little higher than the posterior, which is longer than high; a small preocular, followed by a single small scale; two small postoculars; two presuboculars; four supraoculars, three touching the frontal; seven or eight superciliaries, the anterior more than twice the size of the last; upper palpebral scales directly in contact with the superciliaries; four or five elongate, enlarged scales on lower eyelid separated, by two or three rows of granular scales, from the subocular labial.

Primary temporal small, quadrangular or somewhat rectangular, in contact, sometimes narrowly, with the lower secondary; upper elongate, widened posteriorly; tertiary temporal small, separated from the auricular opening by a single scale; seven upper labials, the first largest of those preceding the subocular; latter scale much longer than high; sixth and seventh labials of equal size, or seventh largest (rarely the sixth); last labial separated from the ear by two pairs of superimposed postlabial scales, occasionally the scales of each pair fusing to form two large scales; auricular lobules small but rather distinct; ear surrounded by 16-19 scales. Scale rows about neck in postauricular region, 30; constricted portion of neck, 28; about axillary region, 30-32; about middle of body, 26 or 28; about base of tail, 22. Subcaudals small, only slightly enlarged; six preanals, the median pair largest but relatively small, the outer scales overlapping the inner. Limbs relatively small, similar in practically all characters to *tetragrammus* save that they appear a little less robust. The granular area of scales in axilla likewise reduced, as in *tetragrammus*.

Subcaudals, 105; scales from occiput to above anus, 56-59. Other characters not mentioned are as in *tetragrammus*.

Color (in life). A well-defined greenish-olive (rarely olive-brown) above, each scale with a slightly darker indistinct anterior area. Dorsolateral and lateral lines as described in the diagnosis, save that frequently the dorsolateral line is edged with dark brown above; sides of head and throat reddish in males during breeding season; chin, throat, breast, and underside of limbs cream; abdomen and lower surface of tail greenish or greenish-blue. Young specimens much darker, with a brilliant azure tail.

Variation. Forty-five specimens were studied in detail. Most of the characters of the head scales are fairly constant. The prefrontals, however, are in contact in about 40 percent of the speci-

Table of Measurements of *Eumeces brevilineatus* Cope

Museum Number*	K.U. 8196	A.N.S.P. 10754	K.U. 7769	A.N.S.P. 10753	A.N.S.P. 13504	A.N.S.P. 13505	K.U. 7744	K.U. 7768	K.U. 8195	K.U. 7764	A.N.S.P. 10755	K.U. 7748
Snout to vent	66	64	63	61	57	57	59	57	54	48	41.8	33
Tail	.....	.....	.....	113	.....	.....	110	.....	.....	.....	69	.....
Snout to eye	4.8	4.4	4.4	4	3.8	4.2	4.5	4.2	4	3.8	3.2	3
Snout to ear	12	11.5	11.4	11	10.1	10.6	10.7	10	9.6	9.5	8.3	7
Snout to forelimb	21	20	23.5	20	17.9	18.2	20	21	17	18.5	15.2	12.5
Axilla to groin	38	36	37	36	33	30.2	33	33	32	29	24	19
Width of head	10.2	8.2	9	8	8.3	8	8.6	8	8	7.2	6	6
Length of head	11	10	10.3	9.7	9.2	9.6	9.4	9.3	9.2	8.6	7.3	7
Foreleg	14.5	14	13	14	12	13	14	12	13	11.5	10	8
Hind leg	22	20.2	19	20.2	18	18	18.6	17.5	18.5	16	14	11
Longest toe	8	6.6	7	6.6	6	6	7	7	7	6	5.5	4.5

* Numbers 10753, and 10754 (cotypes), 7744, 7764 are from Helotes, Texas; 13504, 13505, 10755, Fort Concho, Tom Green Co., Texas; 7768, 7769, from near Alpine, Brewster Co., Texas; 8195-8196, near Carrizo Springs, Dimmit Co.; 7748, Devil's River, Valverde Co., Texas.

mens. The interparietal is never enclosed. Four supraoculars is the constant number, save in one specimen, which has the fourth transversely split on one side, making five; four postsuboculars, save in one specimen with five. The scales about the ear vary from 14 to 18; the scales in a row from occiput to above anus from 54 to 60, 57 occurring in about half of the specimens examined. Scale rows about the middle of the body are 26-28, save in a single specimen from Fort Concho, Tex., which has only 24. The number 26 occurs thirty-two times, 27, six times, 28, six times. The nuchals usually are two or three pairs, 2-2 occurring twenty-nine times; 2-3 occurring eleven times, 2-1 occurring six times. Only two of

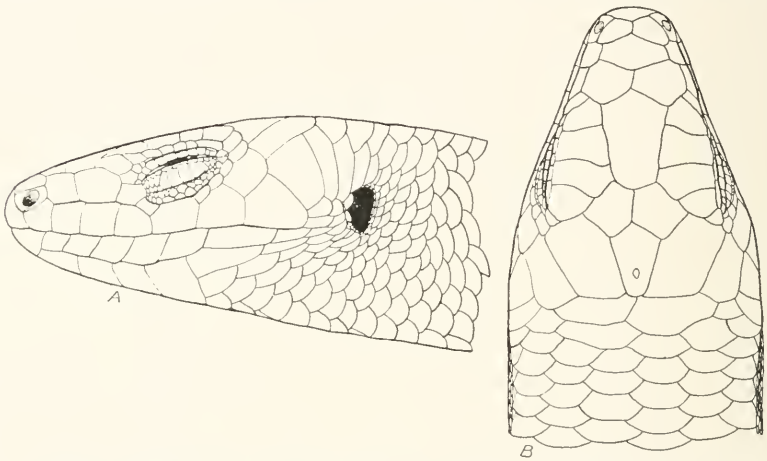

FIG. 42. *Eumeces brevilineatus* Cope. E.H.T. and H.M.S. No. 276; near Sabinas Hidalgo, Nuevo León, Mexico. A, lateral view of head; B, dorsal view of head. Actual head length, 9 mm.; width, 8 mm.

the 45 specimens have two postmentals. The lamellae under the fourth toe vary between 13 and 16, the number 13 occurring five times, 14, nineteen times, 15, thirty-seven times, and 16, twenty-nine times.

Remarks. The relation between *brevilineatus* and *tetragrammus* is indeed close. I have retained the former as a distinct species because I have found no positive evidence of intergradation between the two. The color pattern is seemingly the only positive character that will separate them, since all other characters seem to break down in large series. It appears that ranges of the two species overlap for a known distance of three hundred miles,* another

* This is true if a specimen identified by Strecker (1909) from Burnet county is actually of this species. I have been unable to examine this. There is a probability that it is actually *Eumeces septentrionalis obtusirostris*. If this is incorrectly identified, the known overlap is less than two hundred miles north and south.

reason for maintaining them as distinct species. Should intergradation occur I would expect it to occur somewhere in southern Nuevo León.

The second loreal in *brevilineatus* is usually longer, and the frontoparietals longer than in *tetragrammus;* the legs average slightly shorter, proportionally, to the axilla to groin distance.

This species is apparently much less shy than *tetragrammus.* Most of the specimens I have collected have been seen moving about in daytime. At Helotes the specimens were usually seen along the small gullies which empty into Helotes creek. They would take refuge in masses of leaves or brush and were usually near pools of water. At Alpine, in Brewster county, they were captured from piles of rotting brush along the edge of a tiny stream fed by a spring. Some escaped by entering the water, diving and entering piles of brush which were in the water. Specimens captured near Sabinas Hidalgo in Nuevo León were in rotting piles of brush, formerly the "nests" of pack rats. At Somerset, Atascosa county, Texas, the species was observed about large plants of *Opuntia* and some were captured with the assistance of Mr. A. J. Kirn by removing the large spreading cacti and digging about among the roots.

Distribution. The species occurs through southern Texas west of 97° east long., and south of 31° 30′ north lat., and through the northern part of Nuevo León, and probably also Tamaulipas and Coahuila and eastern Chihuahua.

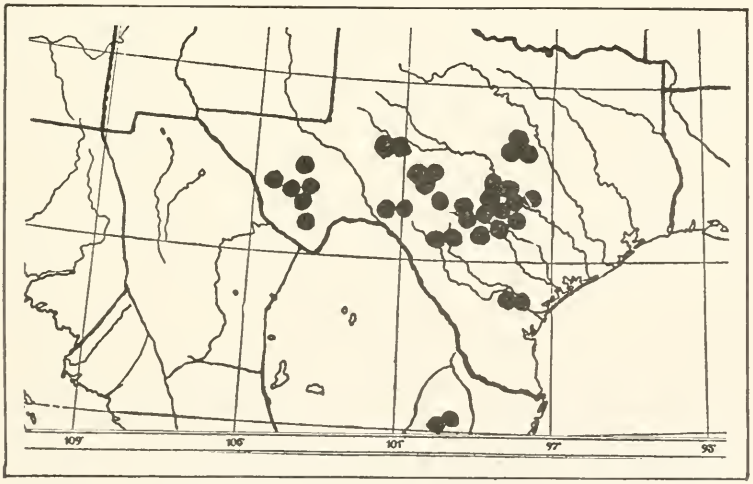

FIG. 43. Distribution of *Eumeces brevilineatus* Cope, in Texas and Mexico.

A single record for Caddo Co., central southern Oklahoma, by Ortenburger (1926) has not been verified by me, but it is possible that these records are based on *Eumeces septentrionalis obtusirostris* Bocourt. Whether these specimens are lost or not I cannot say. They were evidently not in the National Museum in August, 1933. The Nuevo León specimens were collected 31 miles south of Sabinas Hidalgo (3 specimens), and four miles west of Sabinas Hidalgo (1 specimen).

Locality records:

TEXAS:

Brewster Co.: 3 miles southwest of Alpine (K.U. 5); Chisos Mts. (K.U. 1); Glass Mts., 5 mi. north of Marathon (K. U. 1); East Ranger Cañon, Alpine (Cornell 1); Paisano, 5,300 ft. (Bailey, 1905).

Jeff Davis Co.: Cherry Cañon, Davis Mts. (Mich. 3) (M.C.Z. 1).

Valverde Co.: Near mouth of Devils river (K.U. 1); 10 miles north of Comstock (Cornell 1).

Dimmit Co.: Near Carrizo Springs (K.U. 2).

Atascosa Co.: Near Benton (K.U. 1).

Jim Wells Co.: Nueces river, near Casablanca (K.U. 2).

Travis Co.: Near Austin (K.U. 1).

Bexar Co.: Helotes (U.S.N.M. 2 Cotypes) (A.N.S.P. 2 Cotypes); Helotes, 20 mi. NW San Antonio (Cornell 6) (Baylor 6) (K.U. 2); Somerset (K.U. 1); San Antonio (K.U. 1) (Taylor Coll. 1); near San Antonio (A.M.N.H. 4); Medina river, San Antonio (Cornell 1).

Comal Co.: New Braunfels (K.U. 2).

McCulloch Co.: Brady Creek (Taylor-Smith 2).

Hays Co.: San Marcos (A.M.N.H. 4) (Mich. 1) (Field 1) (Baylor 2).

Kendall Co.: Boerne State Park (Cornell 1); Boerne (Strecker, 1926).

Wilson Co.: Cibolo creek (Baylor 6); C. A. Goeth Ranch (Baylor 3).

Tom Green Co.: Fort Concho (A.N.S.P. 3).

McLennan Co.: (Field 1); Bluff creek (Baylor 10); Tonkaway creek (Baylor 13) Rock creek (Baylor 1).

Burnet Co.: Morgan creek (Field 1); White Eagle Copper Mine (Baylor 1).

Unidentified locality: Texas (M.C.Z. 2).

NUEVO LEÓN: Four mi. west Sabinas Hidalgo (Taylor-Smith 1); 31 miles south of Sabinas Hidalgo (Taylor-Smith 3).

Eumeces callicephalus Bocourt

(Plate 23; Figs. 44, 45)

SYNONYMY

1879. *Eumeces callicephalus* Bocourt. Miss. Sci. Mexique et Cent. Amer., Liv. 6, 1879, pp. 431-433, Pl. XXII D, figs. 2, 2a, 2b, 2c, and Pl. XXII E, fig. 2 (type description; type locality, Guanajuato, Mexico, Dugès Coll.); Cope, Proc. Amer. Phil. Soc., XXII, Jan. to Oct., 1885, p. 170 (Key); Günther, Biol. Cent. Amer., Rept., Batr., (1885-1902), 1885, Oct., p. 431; Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 378 (Ciudad, Forrer Coll.); Cope, Bull. U. S. Nat. Mus., No. 32, 1887, p. 46; Cope, Ann. Rept. U. S. Nat. Mus., 1898 (1900), p. 628 (key); Taylor, Uni. Kansas Sci. Bull., XIX, Nov., 1929, pp. 67-69 (Huachuca Mts., Arizona; first report for U. S.).

1882. *Eumeces fasciatus* (part.) Yarrow. Bull. U. S. Nat. Mus., No. 24, 1882, p. 42 (specimen from Gila river, Arizona); Burt, Occ. Papers Mus. Zoöl. Univ. Michigan, No. 201, 1929, p. 4.

1897. *Plesthiodon callicephalum* Dugès. La Naturaleza, (2), II, 1896, (1897), pp. 480 and 483.

?1900. *Eumeces quinquelineatus* (part.) Cope. Ann. Rept. U. S. Nat. Mus., 1898 (1900), p. 639 (specimens from Gila river, Arizona, No. 9231).

?1900. *Eumeces guttulatus* (part.) Cope. Ann. Rept. U. S. Nat. Mus., 1898 (1900), p. 646 (specimen from Gila river, Arizona; No. 9231).

1922. *Eumeces obsoletus* (part.) Van Denburgh. Occ. Papers California Acad. Sci., X, Vol. I, Liz., 1922, p. 592 (young specimens; Huachuca Mts.).

History. Apparently the earliest specimen (or specimens) of this species was collected by Dr. C. G. Newberry in 1873, along the Gila river, Arizona; at least there is a small specimen in rather bad state still listed under Cat. No. 9231 in the U. S. National Museum. The original listing of this number by Yarrow (1882) gave three specimens, all identified as *Eumeces fasciatus,* collected by Dr. C. G. Newberry, Gila river, Arizona. Cope (1900, p. 639) first lists No. 9231 under *Eumeces quinquelineatus,* "3 spec. Gila river, Arizona; Dr. C. G. Newberry, collector," and later (p. 646) under *Eumeces guttulatus,* "Gila river Arizona, 1 spec. Dr. C. G. Newberry, collector." Burt (1929) has recently examined the (apparently) sole remaining specimen of the original lot and incorrectly identified it as *Eumeces fasciatus.*

The discovery of the type specimen of this species was made by Dr. Alfredo Dugès near Guanajuato, Mexico, who sent a specimen to the Paris Museum, prior to 1879. It was carefully described by Bocourt (1879) in the "Mission Scientifique au Mexique." He noted that the species shows certain similarities to *Eumeces sumichrasti.* There is, however, no close relationship between them, as they belong apparently to widely differing groups. Mr. Forrer collected a specimen for the British Museum in Ciudad, Mexico (presumably one of three villages of this name in Durango, rather than Sinaloa), which is described in Boulenger's Catalogue of Lizards, 1887. In 1928 I found and recognized the species in the Huachuca Mountains in southeastern Arizona, and subsequently a specimen, which is now in the Museum of the University of Michigan, was collected there by H. K. Gloyd.

Two specimens in the California Academy of Sciences from the Huachuca Mountains (mentioned by Van Denburgh, 1922, as young *obsoletus*); one specimen in the Field Museum, Chicago, collected at Tombstone, Ariz., a specimen in the Harvard Museum from Madera, Chihuahua, Mexico; and four specimens in the Alfredo Dugès Museum, Guanajuato, represent the material I have had available for study besides specimens collected by myself.

Diagnosis. A medium-sized species probably not reaching a body length greater than 70 mm. (largest specimen known 65 mm.); dorsolateral and lateral light lines present which may disappear or become obsolete before the middle of the body is reached; a short median light line forking on the nuchal; a dark, blackish or brownish lateral stripe; limbs fail to touch when adpressed, even in young; scales from parietals to above anus, 56 to 59; scale rows on the middle of the body, 28, rarely 26; two postmentals; postnasal present or absent (usually absent in Arizona specimens); subcaudals very slightly widened; seven upper labials, the last largest or equal to sixth; prefrontals in contact.

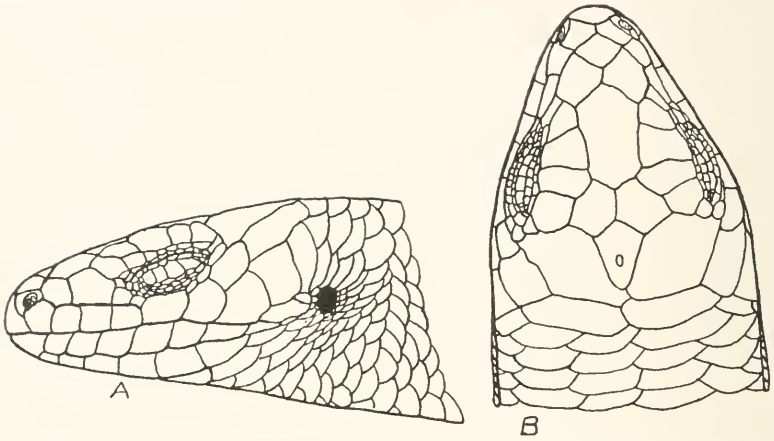

FIG. 44. *Eumeces callicephalus* Bocourt. K.U. No. 6474, Ash Cañon, Huachuca Mts., Arizona. A, lateral view of head; B, dorsal view of head. Actual head length, 10 mm.; width, 8.5 mm.

Description of the species. (From M.C.Z. No. 15928, Madera, Chihuahua, Mexico.) The portion of the rostral visible above, large, nearly equal to the area of the frontonasal; supranasals large, separating the frontonasal from the rostral; the frontonasal hexagonal, somewhat broader than long, touching the anterior loreal; prefrontals only slightly smaller than the frontonasal, forming a broad median suture; frontal moderate in size, about equal in length to its distance from the tip of the snout; the sides very straight, converging somewhat, the anterior part forming an obtuse angle, the posterior a right angle (posterior tip of the frontal abnormally segmented transversely); frontoparietals pentagonal, forming a median suture; interparietal small, broadly enclosed behind by the large parietals; two pairs of nuchals, both rather narrow, but transversely elongate; nasal small, the nostril large, the anterior

part of the scale much larger than the posterior part, when postnasal is present; postnasal distinct (absent sometimes in more northern specimens), touching two labials and supranasals; anterior loreal much higher and narrower than the second, the two forming equal sutures with the prefrontal; second loreal longer than high, touching three (or two) labials below, separated from the first supraocular; two presuboculars, the upper largest; four supraoculars, the two anterior (or three) touching the frontal; eight superciliaries, the anterior large, forming a suture with the prefrontal equal to that of the first supraocular; one or two small preoculars and two postoculars; upper palpebral scales transparent, in contact with superciliaries (at least five); enlarged scales on lower eyelid separated from the subocular by two or three series of small granular scales; four postsuboculars; seven upper labials, four preceding the subocular labial, all more or less of equal height and seeming to differ little in size, the seventh larger than the sixth (frequently about equal); primary temporal as large as sixth labial, more or less rectangular, distinctly less than half the size of the elongate upper secondary temporal and also forming a distinct suture with the lower secondary temporal; latter relatively large, as large or larger than seventh labial, and about one third of its bulk extending behind the seventh labial (usually about one half or two thirds); tertiary temporal not large or well differentiated, separated from the auricular opening by a large preauricular scale; an elongate postlabial following the seventh labial, lies below the lower secondary temporal and is separated from ear by two tiny preauricular scales; two well-defined auricular lobules. Six lower labials, last very large; two postmentals, the anterior small, touching only the first labial; mental with a much longer labial border than the rostral; three pairs of chinshields, the anterior pair in contact; the postgenial scale somewhat enlarged, bordered internally by a narrow, elongate scale.

The auricular opening moderate, surrounded by about 18 scales; 32 scales about neck immediately behind the ear; 29 about constricted part of the neck; 34 about body in axillary region; 28 about middle of body and 21 about base of tail; the dorsal scales are not or but slightly larger than laterals and are practically parallel on sides save in axillary region and in groin. Scales on side of neck, above and behind insertion of the arm, on side and in groin, with one or two small pits; on the sides these are less distinct but appear to be absent elsewhere; the preanal scales are relatively small, but

the median pair distinctly enlarged, the three on each side smaller; the outer scales overlap inner; the median ventral subcaudal scales slightly larger than the adjoining rows; those under regenerated part of tail are, however, distinctly widened; a scale at the posterior corner of anus is large and shows a slight raised area (present only in males); a very small group of small scales in the axilla.

Arm small; brought forward it fails to reach eye; palm with several enlarged tubercles and a few intercalated smaller granules; a prominent tubercle on wrist behind base of the fifth finger; lamellar formula for fingers: 5; 8; 11; 11; 7; heel bordered by five larger tubercular scales; sole with rather uniformly small tubercles, a single larger one posteriorly; lamellar formula for toes: 6; 10; 12; 15; 11. Scales under tail, 100.

Color. Above, generally olive-brown, the scales with a more olive center, the edges bordered with brown; a dim line begins medially between shoulders and passes forward to the nuchals; here two lines begin and run forward along the edges of the frontal and later unite on the rostral; these lines are very narrow; the dorsolateral light line begins on the first superciliary and runs back across the sides of the neck and along the sides where it follows the inner half of the fourth lateral scale row; it is separated from its fellow by six complete scale rows; it can usually be traced dimly to the tail; a light lateral line runs from rostral along the upper edge of the posterior labials to the upper edge of the ear; below this line posteriorly, labials dark; the lateral line continues from middle part of the ear above arm to groin; between the two light lines is a deep chocolate to blackish-brown stripe beginning on snout, passing back to base of the tail where it ceases; the stripe on the side is two whole- and two half-scale rows wide, narrowing greatly above insertion of the hind limb; lower lips and chin, underside of limbs and anal plates light cream to white (alcohol), while the remainder of the sides and belly is bluish-gray, becoming somewhat brownish below lateral stripe; head dark brown and the light lines on neck bordered with the same color. The light lines on neck are prominent but become less prominent posteriorly.

Variation. The small number of specimens fail to give any complete picture of the variation, but the Arizona specimens seem to differ in the absence usually of a postnasal (absent seven times; present on both sides once; on one side once, while the three Mexican specimens have it present on both sides). They differ, too, in having a narrower lateral brown stripe, one and one half to two scales wide,

Measurements of *Eumeces callicephalus* Bocourt

Museum Number†	Mich.	K.U. 6473	Field 910	Type	M.C.Z. 15928	K.U. 6474	C.A.S. 48095	C.A.S. 48096	K.U. 6476	K.U. 6475	B.M.	K.U. 8813
Snout to vent	65	64.2	63	58	57	58	52.2	50	50	46.5	42	28
Tail				78*		104	87*	86*			65*	
Snout to foreleg	20	22	21		18	20	18.8	18	17	14.5		11.2
Axilla to groin	40	36	36		32	32.8	27	26.7	27.5	23		17
Width of head	10	9.2	8.5	9	9	8.5	7.1	7	7	6	6	5.8
Length of head	9	10.2	9.2	10	10	10	8	8.1	8	8	9	21
Tail, postanal width	7	7	7		7	7.2	4.9	6	5.7	6		3.8
Foreleg	13.5	15	12.5	14	13	13	11.2	12	12	9.4	10	7
Hind leg	20	21	18	20	18.7	17.5	16.8	16	15.8	15.1	15	12
Greatest body width		10			12	10.2			8	8		6.5

* Tip missing or regenerated. The tail of K.U. 6474 is perfect.

† Numbers 6473, 6474, 6475, 6476 Ash Cañon, Huachuca Mts., Ariz.; 48095, 48096 Huachuca Mts., Ariz.; 910 Tombstone, Ariz.; 15928 Chihuahua; B.M. spec., Ciudad, Durango, Mex.; type, Guanajuato; Mich. spec., Ramsey Cañon, Huachuca Mts.; 8813, Huachuca Mts.

with the lateral and dorsolateral stripes missing from the posterior part of the body even in young specimens, and the lines, where present, wider; the frontonasal is generally smaller and is occasionally (twice) separated from both anterior loreals, and in three cases from one; in four cases they touch on both sides as in the Mexican specimen described.

Scale rows in middle of body vary from 26 to 28, 28 appearing 9 times, 27 once and 26 twice; the number of nuchals is variable: 1-1 is the typical number in the northern specimens, 1-2 and 2-2 occasionally occurring. In all specimens examined, save the one described, the three anterior supraoculars touch the frontal. The parietals usually enclose the interparietal, save in one case a small intercalated scale separates them, and in three others the interparietal. In the younger specimens the adpressed limbs are in contact; in adults they are narrowly separated in males, widely so in females.

The distinctness of the lines in the Chihuahua specimen here described seems to differ from the type as well as from Arizona specimens. A young specimen from the Huachuca Mountains has the light lines no more distinct than the adults from the same region. The tails of the young are bright blue to ultramarine and the color is retained until about half grown. The adults of the Arizona specimens are more grayish than Mexican specimens.

In the Alfredo Dugès Museum, Guanajuato, are four specimens labelled "*Plestiodon callicephalus* San Blas, L. Boc." I was unable to examine the specimens save through their container. My inability to discern all the characters must leave their identity in doubt, although a part of them are certainly of this species.

Remarks. The specimens which I collected in Ash Cañon, Huachuca Mountains, Cochise Co., Arizona, were taken at approximately 6,000 feet elevation. Three were captured by overturning small, flat stones exposed to the sun. Another specimen was found running over stones in a tiny stream that trickled at the bottom of the cañon at this elevation. A very young specimen was taken about 1,000 feet lower on the edge of a small flat among weeds and grass.

The stomach contents show the typical food consisting of insects, with a predominance of small Coleoptera, and occasional dipterids and blattids.

The specimen described differs from both the Arizona and Guanajuato specimens in having somewhat narrower dorsolateral lines, and in having distinctly wider brown lateral stripes. They agree in

the general color pattern and in most of the details of squamation. One of the specimens in the Alfredo Dugès Museum, and two in Philadelphia, have the parietals separated.

Probably the most significant character is that the lower secondary temporal extends more of its area behind the vertical line drawn from posterior edge of the last labial than other species.

Distribution. This species is a very wide-ranging one, occurring as it does along the southern part of Arizona, and extending south to the state of Michoacán, Mexico. It is to be found on both sides of the Sierra Madre, at least in the more northern part of its range. Records are available for Arizona, in the United States, and Chihuahua, Durango (probably), Zacatecas, Guanajuato and Michoacán, in Mexico. Specimens have been taken within three miles of the northern boundary of Sonora in the Huachuca Mountains, Arizona.

Most of the records suggest that the species is a highland form, but in the state of Arizona the records for Tombstone and Gila river show that it is not necessarily confined to highlands.

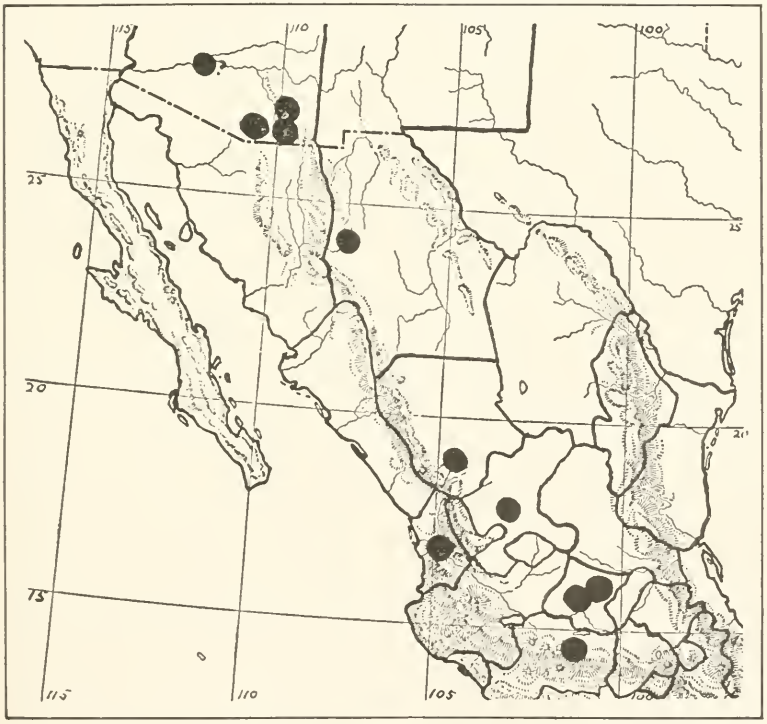

FIG. 45. Distribution of *Eumeces callicephalus* Bocourt, in Arizona and Mexico.

Locality records:

ARIZONA: Gila river (U.S.N.M. 1, Newberry Coll.).

Cochise Co.: Huachuca Mts. (C.A.S. 2, Slevin Coll.); Ash Cañon, Huachuca Mts. (K.U. 5, Taylor, Wright and Lunceford Colls.); Ramsey Cañon, Huachuca Mts. (Mich. 1, Gloyd Coll.); Tombstone (Field 1, Willard Coll.); Carr Cañon, Huachuca Mts. (A.N.S.P. 1, Hebard and Rehn Colls.).

Santa Cruz Co.: Penablanca Cañon, Tumacacori Mts. (A.M.N.H. 1).

CHIHUAHUA: Madera (M.C.Z. 1, Brownlee Coll.).

DURANGO: Ciudad (B.M. 1, Forrer Coll.).

ZACATECAS: Mesquital del Oro (B.M. 1, Buller Coll.).

GUANAJUATO: Guanajuato (Bocourt; type locality; Dugès Coll.) (A.N.S.P. 2) (Dugès, 1897).

MICHOACAN: Michoacán (Dugès, 1897).

NAYARIT: 3 mi. west Tepic (E.H.T. 1, Taylor Coll.).

Eumeces tetragrammus (Baird)

(Fig. 46, Distribution)

SYNONYMY

1858. *Plestiodon tetragrammus* Baird. Proc. Acad. Nat. Sci. Phila., 1858, p. 256 (type description; type locality Lower Rio Grande; type number 3124 U.S.N.M.); Baird, U. S. and Mexican Boundary Surv., Rept. of Bound., Vol. 2, pt. 2, 1859, pp. 12, 13 (Salado river, Doctor Kennerly; and Matamoros, Mex., Lt. Couch.); Garman, Bull. Essex Inst., XVI, Jan. 9, 1884, p. 10; Stejneger and Barbour, Check List N. Amer. Amph. Rept., 1917, p. 71; Pratt, Vert. Anim. U. S., 1923, p. 207.

1875. *Eumeces tegragrammus* Cope. Bull. U. S. Nat. Mus., No. 1, 1875, p. 45; Boulenger, Cat. Liz. Brit. Mus., III, 1887, pp. 375-376; Cope, Ann. Rept. U. S. Nat. Mus., 1898 (1900), p. 660 (fig. 134, probably not of this species; Cook and Cameron counties, Tex.); Brown, Proc. Acad. Nat. Sci. Phila., 1903, p. 553 (restricted to the Texas region); Strecker, Proc. Biol. Soc. Washington, XXI, 1908, p. 49 (Refugio, Refugio Co., Tex.); Baylor Uni. Bull. XII, No. 1, 1909 (Burnett Co., Tex.); Ditmars, The Reptile Book, 1915, p. 199; Stejneger and Barbour, Check List N. Amer. Amph. Rept., 2d Ed., 1923, p. 77; Strecker and Williams, Cont. Baylor Uni. Mus., No. 12, Dec., 1927, p. 14 (Granite and Burnett counties, Tex.); Stejneger and Barbour, Check List N. Amer. Amph. Rept., 3d Ed., 1933, p. 83.

History. The types, originally twelve (or more) in number, were collected in Matamoros, Mexico, partly by Doctor Berlandier, and partly by Lieutenant Darius Nash Couch, who conducted an expedition, surveying a route for a Pacific railway in northern Mexico. Lieutenant Nash purchased a collection from Doctor Luis Berlandier, which probably contained some of the types, and these with his own collections were sent to the Smithsonian Institution in Washington. Spencer Baird described the species in 1858, listing as the type, No. 3124, which number was applied to all the specimens (at least twelve originally). Doctor Kennerly, who was with Lieut. Col. W. H. Emory on the Mexican Boundary Survey, later collected a specimen "Below Salado river" in northern Mexico.

Apparently no further specimens were collected until a much

later date when specimens collected by G. H. Ragsdale and C. K. Worthen in Cook and Cameron counties, Texas, respectively, were sent to the National Museum.

In 1900 Cope mentions that some of the specimens from Matamoros, Mexico, are "lustrous black" and designates two specimens (No. 3120) as the types of a variety *funebrosus*. Since that time very few specimens of *tetragrammus* have been found. There is a single specimen in the American Museum of Natural History, one in the Field Museum, two in the Museum of the University of Michigan, and eight, which I collected in Starr and Cameron counties, Texas, are in the Kansas University Museum. Strecker (see synonymy) reports four specimens, three of which are presumably at Baylor University, Texas. One specimen, reported by Strecker from Brewster county, is, in fact, *Eumeces septentrionalis obtusirostris* (Bocourt) (now No. 58337 U.S.N.M.). One additional specimen from Brule, Texas, is in the U. S. National Museum.

Two specimens in the British Museum from Tampico, Mexico, appear to belong to this species. Mr. H. W. Parker has furnished me with an excellent photograph and a drawing of the head of one of these specimens, and on these I have essayed an identification.

The type series, U.S.N.M. No. 3124, consists at this date (Aug., 1933) of a series of eleven specimens, five of which are in fair condition, somewhat discolored by preservative, but showing more or less of the markings; the remainder of the series is darker, due, I believe, to some unusual preservative. Some of the specimens are a deep lavender, approaching black in color. It is probable that part of this series are types of the *var. funebrosus Cope*. This series bears the catalogue entry "Matamoras Tamaulipas, Lt. B. Couch, collector, 12 specimens." An old specimen in the U. S. National Museum, No. 9233, in bad state, without data, appearing to be of this species, may be the missing twelfth specimen.

I am designating one of the series (specimen measuring 69 mm. snout to vent; tail 95 mm.) numbered by me 3124A, and designated "lectotype" (engraved on back of tag) as the lectotype. This specimen is in good condition, but is somewhat discolored and a few of the scales are missing from the sides and back.

Cope (1900, fig. 134) gives a drawing of a specimen (number 15543 U.S.N.M., a specimen no longer extant) which appears to be a figure of a specimen of *Eumeces septentrionalis obtusirostris* Bocourt. It shows a divided mental (sometimes present in *tetragrammus*), one nuchal instead of the typical two or three, and the

seventh labial separated from the ear by one instead of two pairs of postlabials.

Diagnosis. A medium-sized species characterized by narrow dorsolateral light lines separated by six scale rows which arise on the anterior supraocular and continue to base of tail (absent or dim in old adult males); a lateral line begins on anterior labials, follows along their upper edges, passes through middle of ear and continues on side to groin; a pair of curved lines on head arising on the rostral, terminating on the frontoparietals. Postmental single or divided; no postnasal; parietals do not enclose interparietal; two or three pairs of nuchals; seven upper labials, the last largest; 26 or 28 scale rows; limbs touch when adpressed in young, separated about five millimeters in adults.

Description of species (from K.U. No. 7756, collected 20 miles north of Brownsville, Cameron Co., Texas, by E. H. Taylor; the specimen is an adult male, in alcohol). Portion of the rostral appearing above, not extensive, somewhat less than half the area of the frontonasal; supranasals moderately large, forming a median suture; frontonasals much broader than long, separated narrowly from the frontal, broadly in contact laterally with the anterior loreal; prefrontals rather large, forming sutures with the frontonasal, frontal, second loreal, first supraocular, first superciliary, and first loreal, the lengths of the sutures varying in the order named. Frontal relatively narrow, elongate, considerably longer than its distance from the end of the snout, forming a slightly acute angle anteriorly, and an obtuse angle posteriorly; frontoparietals pentagonal, slightly smaller than the prefrontals, forming a broad median suture; interparietal small, of about same area as a frontoparietal, in contact with first pair of nuchals; parietals rather short, their posterior edges forming a gentle curve; two pairs of nuchals, the anterior wider longitudinally, and shorter transversely than the posterior.

Nasal moderate, divided, the anterior part about equal to the area of the posterior with the nostril; anterior loreal higher than posterior, higher than wide; posterior loreal much longer than high, somewhat angular posteriorly; eight superciliaries, the anterior more than double the size of the posterior; four supraoculars, three touching the frontal; two presuboculars, four postsuboculars; a small preocular followed by a small scale; most of the upper palpebral scales directly in contact with the superciliaries; five elongate, enlarged scales on the eyelid, separated from the subocular by two or three rows of granular scales; two very small postoculars.

Primary temporal rectangular, touching the large fan-shaped lower secondary; upper secondary temporal elongate, widened posteriorly; tertiary temporal large, touching the upper secondary; seven upper labials, four preceding the subocular, the first slightly larger, and distinctly higher than the three succeeding scales; subocular longer than high; last labial distinctly larger than the sixth, separated from the auricular opening by (usually) two pairs of scales (each pair sometimes fusing); mental very large, having a labial border equal to rostral and the first upper labials; postmental single, large; three pairs of chinshields, the second pair largest, the first pair in contact; postgenial scale large, bordered on its inner side by a scale much longer than wide. Six lower labials, five on right side, the last greatly elongated. Nineteen or twenty scales around the ear; two auricular lobules, small and inconspicuous.

Lateral scale rows parallel; fifty-six scales in a dorsal row between parietals and a point above the anus; the neck scales following the nuchals are transversely widened; dorsal body scales not or but slightly larger than laterals; scale rows, 29 behind ear; 27 about constricted portion of neck; 30 rows about axillary region, 27 rows about middle of body, and 21 about the base of the tail; six preanals, the median relatively small, but larger than the outer scales which overlap the inner; subcaudals only very slightly widened (103 in specimen with complete tail, K.U. 7754). The lateral postanal scute is not or but slightly differentiated. Limbs well-developed, failing to touch, when adpressed, by a distance equal to two scale-lengths; fourteen scales about the insertion of the arm. Outer wrist tubercle well developed; a group of enlarged palmar tubercles, the three anterior largest. Lamellar formula for fingers: 5; 8; 11; 11; 8. Sixteen scales about insertion of hind limb; two prominent median heel tubercles, with another pair anterior to and slightly lateral to these; other granules on feet somewhat tubercular, slightly imbricate. Lamellar formula for toes: 6; 8; 12; 16; 10. The terminal lamellae are not tightly bound about the base of the claws; toes surrounded by two rows of scales only, a dorsal series and the ventral lamellar series. There is a very much reduced area of granular scales in the axilla.

Color. Above olive-brown, each scale being slightly darker on its anterior third; head yellowish-brown (reddish in life); a pair of dim dorsolateral cream or tan lines begin on the supraocular and are traceable to the tail, separated by six scale rows; a lateral cream line is evident behind the ear (arises on the rostral or first labial in

the young) and can be traced to the groin; between this and the dorsolateral line is a brownish stripe which extends from eye to groin; two lines originate on the rostral, curve back along the sides of the frontal and terminate on the frontoparietals. Chin, neck and breast immaculate cream, as are the undersides of the limbs; abdomen grayish.

Table of Measurements of *Eumeces tetragrammus* Baird

Museum Number** Sex	K.U. 7756 ♂	K.U. 7757 ♂	U.S.N.M. 3124*	A.M.N.H. 8160	Mich. 54050	K.U. 7754 ♂	K.U. 7747 ♂	K.U. 7755 ♀	Mich. 69252 yg.	U.S.N.M. 78581 yg.
Snout to vent	71	71	69	67	64	62	58	54	52	34
Tail	.....	.....	95†	.....	.....	109.5	.....	.....	.....	39
Snout to forelimb	26	24	22	23	19	23	22	17	18	12.2
Snout to eye	5.2	5.2	5	.....	.....	4.5	.....	3.5	.....	.....
Snout to ear	14	13	13	.....	.....	11.2	.....	9.2	.....	.....
Axilla to groin	39	36	34	34	38	34	34	28	27	19
Width of head	11	11	9	8	9.8	9.7	8.5	8	8	.....
Length of head	12.2	11	10	9.3	10.8	10.2	9	9	9.2	.....
Width of body	12	13	10	10	10	10.2	9	8	9	.....
Foreleg	16.5	16.5	14	13	13	15	12	12	13	9
Hind leg	24	22	20	20	18	22	17	17	20	11
Longest toe	8	8	8	10	7	7.2	6	6	7	4.8

* Lectotype. † Broken.

** Numbers 7756, 7757, 54050, 7754, 7755 are from near Brownsville, Cameron Co., Texas; 3124, Matamoros, Mexico; 8160, Padre Island, Cameron Co., Texas; 7747, Arroyo El Salado near Rio Grande City, Starr Co., Texas; 69252 San José, Mexico; 78581, Brule, Rio Grande, Texas.

Variation. Twenty-five specimens have been examined, including the type series. The following scale variations occur: Parietals never enclose the interparietal; frontonasal touches frontal six times, separated 19 times; invariably four supraoculars, with three touching the frontal; the number of upper labials 7-7 save in one case, where the third and fourth are joined on the left side; the seventh labial is the largest; lower labials six; scales about ear 13 to 16; nuchals 1-1, two times; 2-2, sixteen times; 2-3, five times, and 3-3, two times. The mental is single in 21 cases, double in 4 (these latter all in the type series from Matamoros, Mexico). Postnasal invariably absent.

Scales from occiput to above anus vary from 53 to 59; the highest and lowest numbers occur only once; 54, seven times; 55, two times; 56, five times; 57, three times; 58, five times. The scale rows about the neck are 28 or 30, the lower number most frequent; scales about

the middle of the body, 26 to 28; 26, occurs eight times; 27, two times; and 28, fourteen times. The superciliaries vary from five to eight; presuboculars two, the postsuboculars four. One specimen has the frontal transversely segmented. The markings are much more distinct in the young. In a young specimen (K.U. 12746) the dorsolateral and lateral lines are greenish, showing metallic glints. The curved head lines terminate on the frontoparietals; on the neck the dorsolateral line follows the third scale row, then for a time it borders the third and fourth, and through the latter half of the body follows only the fourth row; the dorsolateral line may or may not join the curved head lines anteriorly. The dorsal coloration of the young is much darker than in adults. It is usually blackish-brown with minute metallic flecks. In no specimens I have examined do the curved head lines extend back and form a union. The tail is blue in the young and the abdominal region is usually a light greenish-blue in life.

Remarks. I have usually found this species when tearing up the large "nests" of pack rats. They appear to be especially secretive. I have never observed a specimen moving about above ground. It may probably be that the species is somewhat noeturnal.

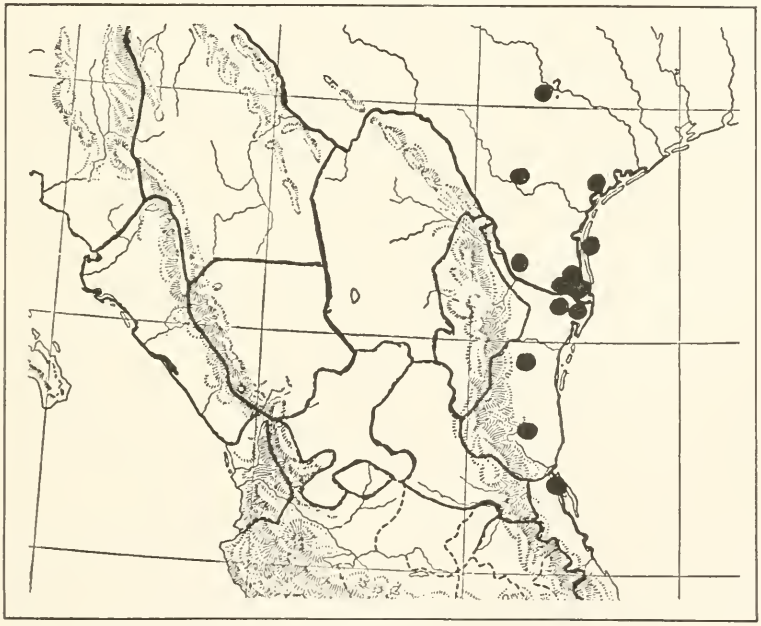

FIG. 46. Distribution of *Eumeces tetragrammus* (Baird), in Texas and Mexico.

The stomach contents examined showed a large percentage of arachnid food. One specimen had several insect egg cases, belonging to an undetermined species, probably a blattid.

Distribution. The locality data available shows this species occupying a territory in southern Texas and Tamaulipas. The most northern (unquestioned) record is Dilley, Tex.; the most southern, Tampico, Vera Cruz, a north-south range of about 500 miles.

Locality records:

TEXAS:

Cameron Co.: Brownsville (U.S.N.M. 1); 20 miles north of Brownsville (K.U. 5) (Mich. 1) (Field 1); Padre Island (A.M.N.H. 1).

Starr Co.: Arroyo El Salado, near Rio Grande City (K.U. 1); Arroyo Los Olmos, 3 mi. SE Rio Grande City (Taylor-Smith 1).

Refugio Co.: Near Refugio (Strecker 1).

Burnett Co.: Honey Creek (Strecker 1).

Frio Co.: Near Dilley (K.U. 1).

TAMAULIPAS, MEXICO: Matamoros (U.S.N.M. Types 11); San José (Mich. 1); Hacienda La Clementina, near Forlón, 68 mi. S, Ciudad Victoria (Smith-Dunkle 1).

VERA CRUZ: Tampico (British Mus. 2).

OBSOLETUS GROUP

To this group I assign a single American species, *Eumeces obsoletus* (Baird and Girard), ranging throughout the southwestern United States and northern Mexico, and three Asiatic forms, *Eumeces chinensis chinensis, E. chinensis pulcher* and *E. kishinouyei.* The group is characterized by the deep black coloration of the young, with light body lines, or lacking all body lines and with a series of white or cream spots on the scales of the head. Tail a brilliant azure blue.

Adults lose the uniform black and blue color and become olive, with a blackish area on each scale, the areas sometimes arranged in rows, forming indistinct lines.

Scales on sides of body in diagonal rows (*obsoletus,* usually) or parallel (in Asiatic forms); postnasal present or absent; seven or eight upper labials; four supraoculars; scale rows 25-30; legs long, overlapping, usually, in adults.

Two postmentals (rarely single); parietals not enclosing interparietal; one pair of nuchals usually; postgenial large, bordered by a scale longer than wide; two or three supraoculars touch frontal.

I believe that the closest relative of this group will be found in the

Fasciatus group, but I cannot definitely point out one member of that group which represents a closer approach than another. The variation in the relationship of the supraoculars to the frontal; the variation in the postnasal; and the superimposed reddish spotting on the sides of the body, are characters which, together with many others, cause me to place these American and Chinese forms together.

KEY TO THE SPECIES OF THE OBSOLETUS GROUP

A. Body lacking light lines in young and adult; the young with white or cream spots on the head scales. (Central and southwestern United States, and Mexico).
Eumeces obsoletus (Baird and Girard), page 305

AA. Body with well-defined lines in young and adults.

B. A seven-lined form; the median light line bifurcating, and appearing dimly on the head; the sublateral more or less broken into spots anteriorly. Very large insular form; maximum size, 164 mm.; the limbs broadly overlapping: 24-26 scale rows; 17 lamellae under fourth toe; two or three pairs of nuchals; normally a postnasal; three (occasionally two) supraoculars normally touch frontal; two postmentals; dorsal and lateral scales of adults usually showing striae. (Yaeyama and Miyaka groups of Riu Kiu Islands).
Eumeces kishinouyei Stejneger, page 334

BB. Five-lined forms, showing no evidence of forking lines on head or striations on scales; smaller forms, maximum size, 127 mm.; normally no postnasal.

C. Three (normally) supraoculars touch frontal; dorsolateral light lines broken; six (normally) upper labials; adult females retain the juvenile color pattern. (Northern central China).
Eumeces chinensis pulcher (Duméril and Bibron), page 328

CC. Normally two supraoculars touch frontal; dorsolateral light line continuous; lateral light line broken into spots, with other light spots above and below it; adult females lose juvenile color pattern. (Southern central China).....*Eumeces chinensis chinensis* (Gray), page 320

Eumeces obsoletus (Baird and Girard)

(Plate 24; Figs. 47, 48)

SYNONYMY

1852. *Plestiodon obsoletum* Baird and Girard. Proc. Acad. Sci. Phila., VI, 1852, p. 129 (type description; type locality, Valley of the Rio San Pedro of the Rio Grande del Norte); Hallowell, Reptiles in Sitgreaves' Rept. of an Exped. down the Zuni and Colorado rivers, 1853, pp. 111, 112 (complete description of type); Hallowell, Proc. Acad. Sci. Phila., 1856, p. 239 (Kansas specimens); Baird, U. S. and Mexican Boundary Survey, Reptiles of the Boundary, Vol. 2, pt. 2, 1859, p. 12, pl. XXV, figs. 9-16 (*obsoletus*); Baird, Expl. and Survey for a R. R. Route to Pacific Ocean, 1859, p. 39 ("Coal Creek, Arkansas"); Garman, Bull. Essex Inst., XVI, Jan. 9, 1884, pp. 14, 15; Stejneger and Barbour, Check List N. Amer. Amph. & Rept., 1917, p. 70; Strecker, Bull. Sci. Soc. San Antonio, No. 4, 1922, p. 22; Van Denburgh, Occ. Papers Cal. Acad. Sci., No. 1, Nov. 23, Vol. I, 1922, pp. 589, 594, pl. 57 (detailed description); Pratt, Vert. Anim. U. S., 1923, p. 206.

1852. *Lamprosaurus guttulatus* Hallowell. Proc. Acad. Sci. Phila., Dec., 1852, pp. 206, 207 (type description; type locality, Fort Fillmore below "Jornada del Muerte," N. M.); Garman, Bull. Essex Inst., XVI, Jan. 19, 1884, pp. 14, 15; Hallowell, Reptiles in Sitgreaves' Report of an Exped. Zuni and Colorado rivers, 1853, pp. 112, 113, pl. IV (complete description of type).

1857. *Plestiodon guttulatus* Hallowell. Proc. Acad. Nat. Sci. Phila., 1857, p. 215; Baird, U. S. and Mex. Bound. Surv., Emory, Vol. 2, pt. 2, 1859, p. 12, pl. 24, figs. 20-28; Baird, Expl. and Surv. of a R. R. Route to the Pac. Ocean, Zoöl., Rept., No. 3, Vol. X, 1859, p. 18 ("Upper Arkansas"); Stejneger and Barbour, Check List of N.

Amer. Amph. and Reptiles, 1917, pp. 69, 70; Van Denburgh, Occ. Papers Cal. Acad. Sci., X, Vol. I, 1922, pp. 594-597 (very detailed description); Pratt, Vert. Anim. of U. S., 1923, p. 207.

1866. *Plistodon obsoletus* Cope. Proc. Acad. Nat. Sci. Phila., 1866, p. 304.

1866. *Plistodon guttulatus* Cope. Proc. Acad. Nat. Sci. Phila., 1866, p. 304.

1875. *Eumeces obsoletus* Cope. Bull. U. S. Nat. Mus., No. 1, 1875, p. 45; Yarrow, Rept. Geog. Geol. Explr. Surv., West 100th Mer., Wheeler, Vol. 5, Zoöl., Chap. 4, 1878, p. 556; Coues, Rept. Geog. & Geol. Explr. and Surv., West 100th Mer., Wheeler, Vol. 5, Zoöl., Chap. V, 1878, p. 604; Cope, Bull. U. S. Nat. Mus., No. 17, 1880, pp. 18, 39, 40 (variations in species); Cragin, Kansas Acad. Sci., VII, 1879-'80, p. 115 (reprint, 1906); Bocourt, Miss. Sci. Mexique, Liv. 7, 1881, pl. XXII A, figs. 4, 4a, 4b, and pl. XXII D, figs. 4, 4a (complete description of a Kansas specimen); Yarrow, Bull. U. S. Nat. Mus., No. 24, 1882, p. 40; Davis and Rice, Ill. State Lab. Nat. Hist. Bull., No. 5, 1883, p. 47; Davis and Rice, Bull. Chicago Acad. Sci., I, No. 3, 1883, p. 31 ("central and southern Illinois"); Boulenger, Cat. Liz. British Mus., III, 1887, p. 374; Cope, Bull. U.S.N.M., No. 32, 1887, p. 46 ("City of Chihuahua"); Cope, Proc. Acad. Nat. Sci. Phila., 1892, p. 334; Cockerell, Amer. Nat., XXX, 1896, p. 326; Van Denburgh, Proc. Cal. Acad. Sci., (2), VI, 1896, pp. 338-349; Cope, Rept. U. S. Nat. Mus., 1898, (1900), pp. 646-649, fig. 128 (detailed description and distributional data); Brown, Proc. Acad. Nat. Sci. Phila., 1903, p. 548; Stone and Rehn, Proc. Acad. Nat. Sci. Phila., 1903, pp. 16, 34; Bailey, North Amer. Fauna, No. 25, 1905, pp. 35, 45; Strecker, Proc. Biol. Soc. Wash., XXI, 1908, p. 73; Strecker, Baylor U. Bull., XII, No. 1, Jan., 1909, pp. 6, 14; Strecker, Baylor U. Bull., XIII, Nos. 4 and 5, 1910, pp. 13, 14; Stone, Proc. Acad. Nat. Sci. Phila., 1911, p. 231; Ellis and Henderson, Univ. Colo. Studies, X, No. 2, 1913, pp. 79, 80, pl. III, figs. 15, 16; Van Denburgh and Slevin, Proc. Cal. Acad. Sci., (4), III, 1913, p. 393; and *idem* (4), V, 1915, p. 106; Strecker, Bull. Baylor Uni., XVIII, No. 4, 1915, p. 26; Ditmars, Reptile Book, 1915, p. 198; Jordan, A Manual Vert. Anim. U. S., 1916, p. 201; Anon., Okla. Geol. Survey Circular 6, 1917, p. 35; Ste'neger and Barbour, Check List N. Amer. Amph. Rept., 2d Ed., 1923, p. 76; Van Denburgh, Proc. Cal. Acad. Sci., (4), XIII, No. 12, 1924, p. 214 (New Mexico records); Ortenburger, Copeia, No. 155, 1926, p. 138 (Oklahoma); Ortenburger, Univ. Okla. Bull., Proc. Oklahoma Acad. Sci., IV, pt. 1, 1926, p. 95 (Oklahoma); Strecker and Williams, Cont. Baylor U. Mus., No. 12, Dec., 1927, p. 14 (Texas reports); Ortenburger, Copeia, No. 163, 1927, p. 47 (Oklahoma record); Burt, Occ. Papers Mus. Zoöl. U. Mich., No. 189, 1927, p. 4; Burt, Trans. Acad. Sci. St. Louis, XXVI, No. 1, 1928, pp. 58-63 (Unites *obsoletus* and *guttulatus;* habits and distribution in Kansas); Burt, Jour. Kansas Ent. Soc., I, No. 3, 1928, pp. 62, 63; Burt, Occ. Papers Mus. Zoöl., Uni. Mich., No. 201, June 17, 1929, pp. 1-12, pls. 1-3 (monographic treatment); Gloyd, Trans. Kan. Acad. Sci., XXXI, 1929, p. 120 (breeding habits); Burt and Burt, Jour. Wash. Acad. Sci., XIX, No. 20, 1929, p. 455 (Kansas); Burt and Burt, Amer. Mus. Nov., No. 381, 1929, p. 10 (Kansas); Strecker, Baylor Uni. Contr. to Folklore, No. 3, 1929, p. 6 (aquatic and hibernation habits); Force, Copeia, No. 12, 1930, p. 29 (Oklahoma); Ortenberger and Freeman, Pub. Uni. Okla., XI, Biol. Survey, No. 4, 1930, p. 181 (Oklahoma); Strecker, Cont. Baylor U. Mus., No. 23, 1930, p. 11; Mosauer, Occ. Papers Mus. Zoöl. U. of Mich., No. 246, 1932, p. 10 Guadalupe Mts.); Stejneger and Barbour, Check List N. A. Amph. Rept., 3d Ed., 1933, p. 82.

1875. *Eumeces guttulatus* Cope. Bull. U. S. Nat. Mus., No. 1, 1875, p. 45; Yarrow, Rept. Geog. and Geol. Explr. and Surveys, West 100th Mer., Wheeler, Vol. 5, Zoöl., Chap. IV, p. 556; Coues, Rept. Geog. and Geol. Explr. Surv., West 100th Mer., Wheeler, Vol. 5, 1878, p. 604; Cragin, Trans. Kan. Acad. Sci., VII, 1879-'80 (1880), p. 115 (reprint, 1906); Yarrow, Bull. U. S. Nat. Mus., No. 24, 1882, p. 41; Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 369; Cope, Rept. U. S. Nat. Mus. for 1898, (1900), pp. 645, 646, fig. 127; Bailey, N. Amer. Faun., No. 25, 1905, pp. 35, 45; Strecker, Baylor Uni. Bull., XIII, Nos. 4 and 5, 1910, p. 13; Ellis and Henderson, Univ. Colo. Studies, X, No. 2, 1913, pp. 78-80, figs. 15, 16; Strecker, Baylor Bull., XVIII, No. 4, 1915, p. 26; Ditmars, The Reptile Book, 1915, p. 198; Jordan, A Manual of Vert. Anim. U. S., 1916, p. 201; Stejneger and Barbour, Check List of N. Amer. Amph. Rept., 2d Ed., 1923, p. 75; Grant, Copeia, No. 164, 1927, pp. 67-69 (habits); Burt, Occ. Papers Mus. Zoöl. U. Mich., No. 189, 1927, p. 14 (regarded as "probably" *obsoletus*); Burt, Jour. Kansas Ent. Soc., 1, No. 3, 1928, p. 62; Ortenburger, Copeia,

No. 173, 1930, p. 94; Ortenburger and Freeman, Pub. Univ. Okla., Vol. II, Biol. Surv., No. 4, 1930, p. 181.

1929. *Eumeces fasciatus* Burt (non Linné). Occ. Papers Mus. Zoöl. Univ. Mich., No. 201, June 17, 1929, p. 6.

History. This large and conspicuous member of the genus enjoys the distinction of having been described twice the same year, and in the same journal,* under different names and in different genera.

The older name, *Plestiodon obsoletum,* appearing on page 129 (*loc. cit.*), was applied by Spencer Baird and Charles Girard to an adult specimen (No. 3133 U.S.N.M.) collected by John H. Clark (under Col. J. D. Graham), of the Mexican Boundary Commission, in the Valley of the Rio San Pedro (at present Devil's river), Texas. The second name, *Lamprosaurus guttulatus* (appearing on page 206), was applied by Edward Hallowell to a very young, mutilated specimen, collected by Doctor Hammond below the Jornada del Muerte, Fort Fillmore, N. Mex.

The following year Hallowell (1853) redescribed the adult specimen from, presumably, Baird and Girard's type specimen (different total length given); he likewise published a detailed description of the type of *Lamprosaurus guttulatus* in the same work. This type is now in the Philadelphia Academy of Natural Sciences Collection. Three years later (Hallowell, 1856) *Plestiodon obsoletus* was reported from Kansas on the basis of five specimens sent to the Philadelphia Academy.

In the next year, Hallowell (1857), having obtained two Kansas specimens of the young, referred them to *Plestiodon guttulatus,* relegating his *Lamprosaurus* to synonymy. Of the type he says, "The original specimen from New Mexico was in such a condition as to render it extremely difficult to determine its true characters." Two years later (Baird, 1859),† both species were figured.

From this time on, to 1917, the two forms were considered distinct. Stejneger and Barbour (1917, page 69), in a footnote to *Plestiodon guttulatus,* state, "Possibly the young of *obsoletus?*," but in 1923 the names are maintained as distinct species. Since that time, certain authors have synonymized the forms, and, in the most recent checklist (Stejneger and Barbour, 1933), they are considered as a single species.

In published works *Eumeces obsoletus* has only on rare occasions been confused with other species. Van Denburgh (1922) referred

* Proceedings of the Academy Nat. Sci., Philadelphia, 1852.

† Baird, U. S. and Mexican Boundary Survey, Rept. of the Boundary, 1859, pp. 1-35, plate XXV, figs. 9-16 (*obsoletus*) and plate XXVI, figs. 20-28 (*guttulatus*) the latter from San Elizario, Tex.

specimens of *Eumeces callicephalus* from the Huachuca Mts., Arizona, to this species as the young. Cope, at an earlier date (1900), confuses a young *callicephalus* with this form (U.S.N.M. 9231), a specimen which Burt (1929) erroneously refers to as "a young and mutilated specimen of *fasciatus*." In this same work Burt refers to a specimen of *obsoletus* (U.S.N.M. 3151, Matamoros, Mex.) as "Probably *fasciatus*."

In certain museums the species has been confused with *multivirgatus*, and numerous specimens were found so labeled.

With the exception of *Eumeces fasciatus* (including *laticeps* and *inexpectatus* as treated by recent authors), this is the best known American form, due to numerous, and in some cases extensive, accounts of it that have appeared.

With regard to the relationship of this species I have been somewhat in doubt. I believe that it should be considered in a section apart and may represent one of the older species of the group. The absence of any typical, white, dorsolateral or lateral lines, and the intense, uniform, black coloration of the young with the cream or yellow light spots on the head, show a lack of near relationship with any of the other species in its own group. It agrees with *Eumeces longirostris* in having (usually) the lateral scales arranged diagonally, but in all other pertinent characters they differ widely. In the scale pattern of the head, the character of the preanal plates, the terminal scales of the digits, the scales about the insertion of the limbs, the character and relationship of the postgenial, this form differs but little from the *Skiltonianus* and *Fasciatus* groups and may be an aberrant form derived from the common ancestral stock of these groups.

The type specimen (No. 3133 U.S.N.M.) is still in good condition save that many of the dorsal scales have slipped.

Diagnosis. A large species lacking typical, median, dorsolateral and lateral white lines; young black, with white spots on upper and lower labials, and on other head scales except loreals and temporals; pitting on scales dim in young, but still evident in adults; outer preanal scales overlapping inner; subcaudals widened; postgenial large, bordered by a scale longer than wide; one or no postnasal; two postmentals (rarely one); nuchals small; lateral scale rows usually diagonal; usually 26 or 28 scale rows about the middle of body.

Description of species (from No. 4804, Taylor-Smith collection. Rio Grande City, Tex., September, 1932; adult male). Portion of

the rostral visible from above about equal to the area of the frontonasal; supranasals relatively large, forming a median suture; frontonasal generally lozenge-shaped, in contact laterally with the anterior loreal, widely separated from the frontal by prefrontals; latter large, each nearly equal to area of the frontonasal; their broadest suture with the frontonasal; sutures likewise formed with the frontal, second loreals, first loreals, first superciliaries, and first supraoculars, the length of sutures diminishing in the order named; frontal not especially large, somewhat shorter than its distance from tip of snout or from the posterior part of interparietal, more than one and one half times wider anteriorly than posteriorly, the sides

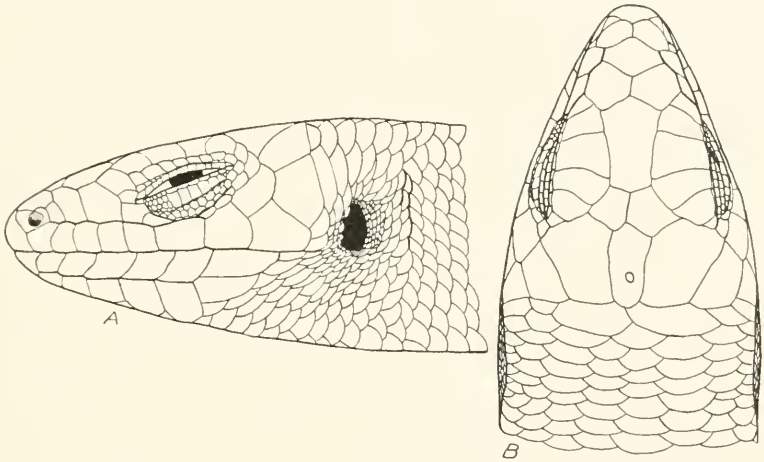

Fig. 47. *Eumeces obsoletus* (Baird and Girard). K.U. No. 7775, Cameron Co., Texas. A, lateral view of head; B, dorsal view of head. Actual head length, 16.5 mm.; width, 14 mm.

generally straight, or very slightly concave; frontoparietals large, forming a long median suture, widely separating interparietal and frontal; interparietal narrow, elongate, less than once and a half times as wide anteriorly as posteriorly, not enclosed by the parietals; parietals relatively short and wide; a single pair of small, differentiated nuchals.

Nasal scale somewhat smaller than supranasal, the scale divided by a suture from nostril to upper edge, and another from the nostril to the lower edge of the scale; the anterior portion equal to or somewhat smaller than posterior part, including nostril; anterior loreal narrow, higher than posterior; latter large, the anterior part of upper edge not or slightly higher than the posterior, highest in the middle, lower edge on a level with that of the anterior; two

presuboculars, the anterior large, the second small, slender, distinctly elongate, not forming a notch between fourth labial and subocular labial, but lying with the greater part of its length above the subocular; four supraoculars, three touching frontal, the last short and wide, but much larger than first; eight superciliaries, the anterior largest, nearly equal to the first supraocular, at least four times the area of the second superciliary, and about twice as large as the last, vertical superciliary; four postsuboculars, the most posterior much longer than others, about half the size, and of same general shape as, the primary temporal; latter longer than wide, diagonally placed, about one fourth or one fifth the size of the upper secondary temporal, forming a suture with the lower secondary, thus separating the seventh labial and the upper secondary temporal; lower secondary temporal irregularly triangular, the apex pointing down; tertiary temporal slender, elongate, bordering the lower secondary, widely separated from the ear opening by two postlabial scales; seven upper labials, the last largest; the four anterior with approximately the same identical elevation, the third or fourth larger than the two anterior; seventh labial separated from the auricular opening by a pair of enlarged postlabials, which are succeeded (usually) by two pairs of smaller scales; the auricular lobules are thick, flattened against the edge of ear opening rather than extending out from edge; six lower labials, last much elongated; mental large, the length of the labial border not or but slightly larger than that of rostral; three pairs of chinshields, the anterior pair smallest, separated (usually in contact); postgenial large, elongate, bordered on the anterior internal edge by a scale longer than wide. No postnasal on left side; a small postnasal present on the right side; four median upper palpebral scales touching the superciliaries; lower eyelid with a series of vertically elongate, opaque scales (transparent in life) on lower lid, separated from the subocular by three or four rows of small granular scales, the lowermost row somewhat large, frequently pigmented and suggesting a continuous row involving presuboculars and postsuboculars.

Scales about body are arranged in six or seven parallel rows on the dorsal surface of the back, while those on the sides are arranged in diagonal rows from shoulder to groin; the ventral rows are again parallel; the scales of the two median dorsal rows widest; all dorsal rows larger than laterals or ventrals. Thirty-seven scale rows about the anterior part of neck behind ear; 32 about constricted portion of neck; 40 rows behind insertion of arm; 25 rows about middle of

body; 19 rows about base of tail (at first widened subcaudal). In a dorsal row from parietal to above anus, 59 scales; 99 widened subcaudals, their transverse length about three and one half to four times their longitudinal length; preanal region bordered by six scales, the two median large, the outer scales overlapping the inner; about 22 scales around the ear opening.

Limbs well-developed, overlapping the width of eight lateral scales when adpressed; 22 scales about insertion of the hind limb; 17 scales about insertion of forelimb; lamellar formula for fingers: 7; 10; 13; 13; 7. A heavy thickened scale on outer side of wrist; palm covered with several much enlarged, flattened, tubercular scales, intermingled with others of varying sizes; lamellar formula for toes: 7; 10; 15; 17; 11. Heel bordered by six large padlike scales, the three outer the larger, the most distal at the base of the fifth and first toes; sole with two, much-enlarged tubercles surrounded by numerous scales of varying size; the intercalated series of scales on the fourth toe on outer side reaches to base of antepenultimate phalanx; terminal lamellae not tightly bound about claw base; a group of small granular scales in axilla; none behind the insertion of the hind limb.

The pitting on the scales is evident on sides of neck, axillary region, along side of body and at side of the base of the tail, on scales of dorsal and posterior parts of upper arm, and on posterior and dorsal surface of the femoral region. However, the pits are small and few in number on each scale and are discerned with difficulty.

Color. Above, the general color of the dorsal region may be defined as a brownish to olive-gray, generally olive-brown on head; a lighter gray to bluish-gray on sides; undersurface generally creamy white; the ground color of the tail is light brownish or putty color. All the scales of the dorsal surface and the upper lateral region edged with dark brownish-black to black, the color somewhat more intense on lateral side of scales, thus forming indefinite parallel lines on back and irregular diagonal lines on the dorsolateral region.

Dorsal head scales clouded with darker, while lateral head scales are frequently spotted or edged with dark brown; upper labial scales with light cream spots distinctly discernible; lower labials light, like ventral surface; beginning in the vicinity of the auricular opening, there is a series of indefinite brick-red spots, which continue to groin; part of the blotches are in the more heavily pigmented dorso-

lateral region; others are lateral, on the more uniform grayish lateral ground color; upper parts of limbs with markings like those on dorsolateral region of body; below white; dorsal lamellae on toes light, edged with deep brown posteriorly.

Measurements of *Eumeces obsoletus* (Baird and Girard)

Museum Number* Sex	K.U. 7305 yg.	O.U. 233 ♂	K.U. 7265 ♀	K.U. 7258 ♂	K.U. 7701 ♂	U.S.N.M. 3133 ?	K.U. 7696 ♂	Field 6838 ♂
Total length	.....	129	.....	.....	.....	.....	280	.....
Snout to vent	55	62	73	82	93	110	116	125
Snout to foreleg	20	22	27	28	30	31	36	.....
Tail	.....	67	.....	.....	.....	.....	164	.....
Width of head	10	10	11	15	15	18	19	23
Length of head	10	10.5	11	14.5	16	19.4	16	22
Postanal tail width	6	6	7	9	13	.....	15	18
Foreleg	14	17	18	22	24.6	22	28	31
Hind leg	19	22	23.5	30	26	33	35	45
Longest toe	7	8	8.5	10	10	10	12	13
Axilla to groin	29	32	39	45	49.5	55	64	65

* No. 7305, Morton Co., Kansas; 7265, 7258, Hyatt, Anderson Co., Kansas; 7701, 7696, Douglas Co., Kansas; 233, Franklin Co., Kansas; 6838, Brownsville, Cameron Co., Texas; 3133, type, Valley of Rio San Pedro, Rio Grande del Norte, Texas.

Color variation. Cope (1900, p. 648) mentions some unusually marked specimens from Kansas, forwarded by Professor Snow, and, presumably, from the vicinity of Lawrence, Kansas. Adults of some Kansas and Oklahoma specimens develop a rather elaborate distribution of the dark pigment so that a secondary pattern is developed. The deep blue-black coloration of the young gives place to a lightening of the color on the centers of the scales so that at about the third year many approximate the color pattern of individuals from the southern and western part of the range. Then as they become older there is a tendency for the segregation of more pigment at the outer edges of the scales of the first and second rows, thus defining two dark lines, with a wide (width of two scales) stripe of nearly uniform olive ground color, usually without black pigment, though sometimes with the edges of scales dark; the diagonal rows on the sides likewise shift the bulk of the pigment to the lateral edges of the scales, making series of diagonal dark lines. In many old males the regularity of the lines is obliterated and the pattern appears as scattered flecks over the dorsal and dorsolateral parts of the body.

The lined type of coloration is more or less evident in most adult Kansas specimens (save occasional specimens in the extreme west), in most adult Oklahoma specimens, and occasionally in those of northern Texas. Those from the southern part of Texas, New Mexico, and Arizona have the pigment more evenly distributed and the lineation is usually not at all or only dimly discernible. The amount of pigment on the tail is very decidedly less in southern specimens, and in the young adults the tail may assume a pale yellow-green color without any dark pigment, and in the older ones the tail is very much lighter than the ground color of the back. However, it appears that this character is developed gradually, and progressively more dark pigment is in evidence the farther north the species is traced.

The color of the young is much the same throughout the range. This, at hatching, is a deep black over much of the body, with the tail a vivid blue. The head scales, at least most of them, have each a creamy white spot varying in size in different scales. These dots on the top of the head are arranged so as to suggest a typical pattern of dorsolateral white lines and "bifurcating lines" in the mesial region. A similar series of larger ocellated whitish cream dots are in evidence on each upper labial and each lower, and invariably present are two larger auricular spots, one preceding, the other posterior to, the auricular opening. Occasionally, a young specimen shows a dim, more or less continuous, white line from the nuchal scale along the neck to a point near the shoulder, and in such cases there is likewise a light lateral line running from ear to a point near to or above the insertion of the foreleg. However, this has been discerned in specimens from widely separated localities both in the north and south, and may appear in a single specimen of a brood where, in all the other specimens, these lines are lacking. In the northern specimens, the white dots on the dorsal surface of the head border the sides of the frontal and may extend to near the nuchals; in more southern and particularly southwestern specimens, from southeastern Arizona, the dots do not usually follow the sides of the frontal. Occasionally there is a white dot in the mesial region of the anterior part of the frontal, which sometimes assumes a V-shape. This general coloration of the young is retained through the second year, and the deep color is usually replaced by lighter areas on the centers of the scales. Postmentals and chinshields frequently have white spots less distinct than those on the labials.

In adult males, some reddish coloration may develop on the tem-

poral region. In old males the temporal region is somewhat bulged out. It never reaches such dimensions as occur in *laticeps*.

Scale variation (approximately 260 specimens). Like other members of the genus, many scale characters are decidedly unstable, although in the number of scale rows about the body and in the number of scales in a row from parietals to above vent the range of variation is less than in most other species.

No specimens have been seen with parietals enclosing the interparietal; the nuchals are normally one pair; two pairs have been found only four times, while an added scale on one side has been found ten times.

The divided postmental shows only three exceptions; one each from Riley and Anderson counties, Kansas, and one from Cochise Co., Arizona, in which there is a single scale.

The postnasal scale is very unstable and is absent sporadically in southern specimens, but generally present, while in specimens from Kansas it is generally absent. The percentages are as follows: Southern Texas, New Mexico, and Arizona specimens 97 percent present; Oklahoma, 40 percent; Kansas (counting two specimens as one where scale is present on one side), 22 percent. In groups of specimens from certain counties in eastern Kansas the percentage is sometimes less than 4 percent present.

In Kansas specimens there is a strong tendency for the anterior loreal to segment transversely, and this anomaly may be present on one or both sides in as many as 36 percent of the specimens. There is no apparent variation in the subcaudals, chinshields, upper labials (the lower labials, however, are frequently reduced to five), preanals and supraoculars. The size of the frontoparietal and its relation to the loreals is very unstable in northern forms and it may fail to touch the anterior loreal in 39 percent of the specimens. The frontoparietal very rarely is in contact with the frontal, and likewise rarely touches the rostral. Five specimens show it contacting the rostral while only two show it in contact with the frontal, with the consequent separation of the prefrontals.

The frontal varies in length and as a consequence the number of the supraoculars touching it. It appears that the posterior part only is affected, and when the frontal is shortened, the frontoparietals are distinctly larger; the prefrontals are enlarged at the expense of frontonasal and not of the frontal.

The superciliaries vary from seven to ten, the numbers eight and nine occurring most frequently; the general relationship of size, of

the first, second, and last, remains fairly stable. The number of supraoculars is invariably four, but either two or three scales touch the frontal, two being the more frequent number in the northern specimens (Oklahoma, Kansas), while three is decidedly the more frequent number in southern (southern Texas, New Mexico, Arizona). The temporal scales and the two last labials vary a considerable amount in size, but bear the same general relationship. The primary temporal increases in size usually at the expense of the upper secondary. It thus varies from one fourth or one fifth to nearly half the size of the latter scale, and often approximates the lower secondary temporal in size. The tertiary is always present, showing small variation. In by far the greater number of specimens the sixth and seventh labials are equal in area; and in certain localities, especially in specimens from the Guadelupe Mountains, New Mexico and Texas, it is the usual condition. The number of postlabials is five or six, the scales arranged in superimposed pairs; rarely are the pairs united, forming larger scales; the preauricular lobules are flattened, thickened scales, two or three usually in evidence; presuboculars are two, normally, with one occurring several times due to the union of the two scales; a few cases show the presence of three scales, due to a segmentation of the posterior loreal. Four is the expected number of postsuboculars, but five occurs frequently; occasionally the lower row of granular eyelid scales are enlarged somewhat and pigmented, suggesting a continuous post- and presubocular series under the eye.

The number of scale rows varies from twenty-five to thirty. However, the counting is difficult due to the diagonal lines; the higher numbers, 27-28, are most frequent in northern forms; 26-27 more frequent in southern forms; the number of axillary rows is fewer in southwestern specimens than elsewhere. The lateral rows tend in these specimens to approach a parallel with the dorsal rows. The median dorsals are always larger than other dorsals, and all dorsals are usually larger than the lateral series.

The limbs tend to touch or overlap generally in both young and adults, but in some specimens, especially adult females, the legs may fail to touch, and be separated by one or a few scales.

The character of scales on the feet and the arrangement of lamellae differ little or not at all, between the northern and southern forms; the lamellae under the fourth toe range from fourteen to seventeen, the higher number being rare, the lower numbers occurring most frequently.

From the above discussion of the variations in different populations it is evident that subspecific designations could not be reasonably applied to the variants without difficulty. Were the color characters constant, particularly as regards the dark markings of the dorsal and lateral surface, one might separate a subspecies based on the presence of the longitudinal dark dorsal lines and diagonal dark lines. Unfortunately, this character may be absent in young and certain very old specimens. Southern specimens have less dark pigment on the tail, and in southwestern specimens the tail may be almost without marking; but the presence of lines on the back and an intermediate condition of pigment on the tail obtains in certain specimens.

As regards the scale variation we find again a lack of constancy. There is, to be sure, a great tendency to eliminate the postnasal scute in the lined specimens, a tendency which increases to a very great percent as one approaches the northeastern limit of distribution, but the increase from north to south is gradual, as already stated.

As to the direction of the lateral scale rows, one discovers that there is a tendency toward the reduction of interpolated scale rows following the axilla in going south, so that the diagonal tends more toward the horizontal than the vertical; in the southwest this tendency is carried to such a point that in many individuals the lateral rows are distinctly parallel to the dorsal. This is true in perhaps 20 percent of the specimens from Arizona, particularly those from the Huachuca and the Santa Catalina Mountains.

It is obvious that we have to do with subspecies or species in the making, but separable lines have as yet to be strengthened before subspecific forms can be defined clearly enough to avoid confusion. At least, such is my opinion.

Distribution. Eumeces obsoletus occurs throughout most of the central western states and into northern Mexico. Nebraska appears to be the northernmost limit, while in the south, Santa Caterina, Nuevo León, is the most southerly locality record. The eastern records for "central and southern Illinois" (Davis and Rice, 1883), I believe, should be questioned until further evidence of its presence there is noted. I believe the form has not been reported from Missouri, but it most likely occurs along the western border, having been captured in adjoining counties in Kansas. The record for Arkansas (Baird, 1859, p. 39) may be regarded as doubtful, although it may occur along the western part. The name "Arkansas"

may refer to the river. In the west it occurs certainly in Arizona and Colorado, but the single record for Utah (Yarrow, 1882) has been questioned. Woodbury (1931) does not include it in the state fauna. It seems quite likely that this is a correct record. The specimen (No. 8180 U.S.N.M.) was apparently collected by Yarrow himself, but no definite locality is indicated.

I have found the species everywhere either rare or very difficult to find and collect, with the exception of eastern Kansas. Here it is not difficult to obtain, for I have collected two or three dozen individuals of this species in one day—a number which I have scarcely totaled in nearly a half-year's collecting in the southwestern part of its range. It is possible that different habits and habitat make them more difficult to capture there.

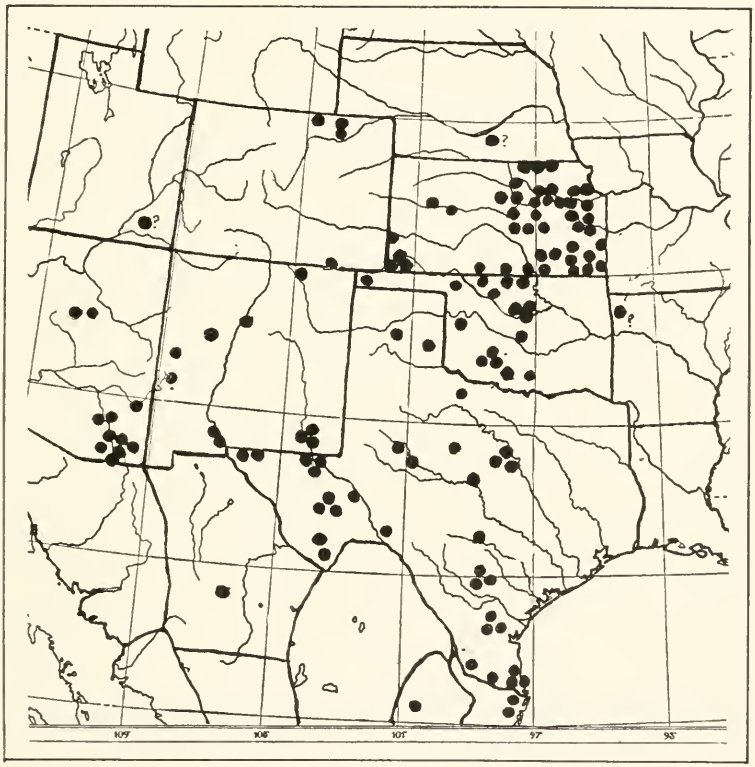

FIG. 48. Distribution of *Eumeces obsoletus* (Baird and Girard), in Central United States.

Locality records:

ARIZONA:

Cochise Co.: Huachuca Mts. (Mich. U. 9) (M.C.Z. 2) (C.A.S. 5); Moctezuma Cañon, Huachuca Mts. (Mich. U. 1) (M.C.Z. 1) (A.M.N.H. 1); Ash Creek (? Cañon, Huachuca Mts.) (U.S.N.M. 1); Carr Cañon, Huachuca Mts. (A.M.N.H. 1) (A.N.S.P. 3); Ramsey Cañon, Huachuca Mts. (L.M.K. 1) (M.C.Z. 1) (S.D.S.N.H. 2); Pinery Cañon floor, Chiricahua Mts. (U. of Cal. 1); Cave Creek (U. of Cal. 1).

Pima Co.: Sabino Cañon, Santa Catalina Mts. (K.U. 1); Tucson (U.S.N.M. 1).

Graham Co.: Fort Grant (Stanford 1).

Yavapai Co.: Prescott (U.S.N.M. 1); Fort Whipple (Coues, 1875).

Indeterminate localities: Cave spring (Yarrow, 1875); Arizona (U.S. N.M. 4).

NEW MEXICO:

Doña Ana Co.: One mile west Las Cruces (M.C.Z. 1); Fort Fillmore (A.N.S.P. 1).

Socorro Co.: Fort Craig (M.C.Z. 1).

Valencia Co.: Grants (U.S.N.M. 1).

Bernalillo Co.: Albuquerque (U.S.N.M. 1).

Eddy Co.: Guadalupe Mts. (Mich. U. 7); Carlsbad (K.U. 1).

Taos Co.: Taos (K.U. 1).

Catron Co.: Near Glenwood (K.U. 2).

Unidentified locality: Bero Springs (Coues, 1875).

UTAH: Only record from "Utah"; collected by Yarrow (U.S.N.M. 1).

NEBRASKA: Only record "Platte river" (U.S.N.M. 1).

ARKANSAS: Upper Arkansas (U.S.N.M. 1); Coal Creek, Arkansas (U.S.N.M. 1). (These localities may refer to the Arkansas river.)

COLORADO:

Larimer Co.: Four miles east of Wellington (Ellis and Henderson, 1913).

Weld Co.: Near Greeley (Ellis and Henderson, 1913); Greasewood Lake, S. E. Osgood (Ellis and Henderson, 1913).

Las Animas Co.: Corrizo Creek (Ellis and Henderson, 1913).

(These Colorado localities have not been verified.)

KANSAS:

Leavenworth Co.: North of Lawrence (K.U. 15) (Cornell 5).

Jefferson Co.: North of Lawrence (K.U. 8).

Douglas Co.: (A.N.S.P. 2); near McLouth (K.U. 30) (Mich. U. 1).

Franklin Co.: Near Ottawa (Mich. U. 5) (Ottawa U. 19).

Anderson Co.: North of Garnett (K.U. 45); Hyatt (K.U. 18).

Bourbon Co.: (Mich. U. 5).

Johnson Co.: (Carnegie 3).

Miami Co.: (Carnegie 1); Haverhill (Carnegie 1).

Allen Co.: (K.U. 3).

Montgomery Co.: Independence (K.U. 2).

Woodson Co.: (K.U. 2).

Shawnee Co.: Topeka (U.S.N.M. 1).

Wilson Co.: (K.U. 1); Neodesha (A.M.N.H. 1).
Osage Co.: (K.U. 8) (U.S.N.M. 1); Burlingame (U.S.N.M. 1).
Elk Co.: (K.U. 2).
Greenwood Co.: Near Toronto (K.U. 14).
Wabaunsee Co.: Wabaunsee (U.S.N.M. 1); Maplehill (U.S.N.M. 2).
Pottawatomie Co.: (K.U. 5) (Mich. U. 13); Rocky Ford Power Plant (U.S.N.M. 1).
Marshall Co.: Waterville (A.M.N.H. 1) (Field 1) (Mich. U. 1); Irving (Mich. U. 2).
Washington Co.: (Mich. 3); Barnes (Field 1).
Riley Co.: (K.U. 18) (Mich. U. 17) (Ottawa U. 14) (A.M.N.H. 5) (Cornell 1).
Geary Co.: (K.U. 1); Fort Riley (A.N.S.P. 7); Junction City (K.U. 4) (U.S.N.M. 1).
Chase Co.: Cottonwood Falls (M.C.Z. 1) (U.S.N.M. 12) (Mich. U. 1); Strong City (U.S.N.M. 1).
Dickinson Co.: Carrelton (K.U. 8).
Marion Co.: (K.U. 4); Florence (K.U. 4); 7 miles south of Marion (A.M.N.H. 1); Marion (U.S.N.M. 1).
Butler Co.: (Carnegie 1); Chelsea (U.S.N.M. 1); Havenhill (A.M.N.H. 1).
Cowley Co.: Winfield (Field 1) (M.C.Z. 1) (U.S.N.M. 14); Arkansas City (K.U. 5).
Sumner Co.: (Burt, 1928).
McPherson Co.: (Burt, 1928).
Saline Co.: (K.U. 1).
Ottawa Co.: (K.U. 8) (Mich. U. 1); Minneapolis (A.M.N.H. 1).
Republic Co.: (Ottawa U. 1).
Ellsworth Co.: (M.C.Z. 1).
Barber Co.: (K.U. 1).
Russell Co.: (K.U. 1).
Ellis Co.: Hays (K.U. 4).
Cloud Co.: South of Miltonville (K.U. 14).
Clark Co.: Ashland (A.M.N.H. 1).
Clay Co.: Clay Center (K.U. 1).
Morton Co.: Walsh's Ranch (K.U. 1).
Hamilton Co.: (Burt, 1928).
Morris Co.: Council Grove (U.S.N.M. 1).
Jewell Co.: Mankato (U. S. N. M. 1).

OKLAHOMA:

Woods Co.: Alva (K.U. 1) (M.C.Z. 2).
Comanche Co.: (Okla. U. 7) (Mich. U. 1).
Tulsa Co.: (Okla. U. 7) (Mich. U. 2).
Alfalfa Co.: (Okla. U. 2).
Murray Co.: (Okla. U. 2) (K. U. 1, with eggs).
Custer Co.: (Okla. U. 1).
Cimarron Co.: 8 miles SW Boise City (Okla. U. 3); near Kenton (Denver Mus. 1).
Kay Co.: (Okla. U. 3); Newkirk (U.S.N.M. 1).
Harper Co.: (Okla. U. 1).

Pawnee Co.: Quay (Ortenburger, 1930).
Osage Co.: Avant (U.S.N.M. 1).
Stevens Co.: Alma (U.S.N.M. 5).

TEXAS:

Brewster Co.: (Mich. U. 1); Chisos Mts. (Mich. U. 1) (Taylor 1).
Jeff Davis Co.: Cherry Cañon, Jeff Davis Mts. (Mich. U. 1); Davis Mts. (Mich. U. 1) (Baylor 1); 20 miles SE Toyahival, 5,000 ft. elev. (Bailey, 1905).
Culberson Co.: Guadalupe Mts., 6,800 ft. (Bailey, 1915); near Frijoles, Guadalupe Mts. (Mich. U. 4).
Cameron Co.: Brownsville (Field 1) (K.U. 5).
Starr Co.: Rio Grande City (Taylor-Smith 1).
McLennan Co.: McGregor (Strecker, 1908); Tonkaway Creek (Baylor 4); Bluff Creek (Baylor 1).
Burnett Co.: Atkinson Ranch, near mouth of Spring Creek (Baylor 1).
Mitchell Co.: Colorado (Baylor 1).
Wilbarger Co.: Harrold (Baylor 1); Vernon (Baylor 1).
Travis Co.: (Strecker, 1930).
Potter Co.: Near Amarillo (Mich. U. 2).
Duvall Co.: San Diego (Phila. 7) (Taylor-Smith 7) (Brit. Mus. many); near Hebronville (Mich. U. 3).
Valverde Co.: Valley Rio San Pedro (U.S.N.M. 1; type).
Bexar Co.: Helotes (Phila. 1) (Baylor 5).
Reeve Co.: Pecos (Phila. 5).
El Paso Co.: El Paso (Field 1) (Senckenberg 3); San Elizario (U.S.N.M. 1).
Eastland Co.: Eastland (K.U. 1).
Howard Co.: Big Springs (Cope, 1892).
Hidalgo Co.: Edinburg (Cornell 2).

MEXICO:

Tamaulipas: (U.S.N.M. 1); Matamoros (U.S.N.M. 2).
Nuevo León: Santa Caterina (U.S.N.M. 1).
Chihuahua: City of Chihuahua (U.S.N.M. 1).

Eumeces chinensis chinensis (Gray)

(Plate 25, Figs. 2, 3; Figs. 49, 50)

SYNONYMY

1838. *Tiliqua chinensis* Gray. Ann. Mag. Nat. Hist., II, 1838, p. 289 (brief type description; type locality, "China").

1839. *Plestiodon sinense* Duméril and Bibron. Erp. Gén., V, 1839, p. 704 (description; Canton; *Tiliqua chinensis* is given as a synonym); Hallowell, Proc. Acad. Nat. Sci. Phil., 1856, p. 154 (Ningpo); and Trans. Amer. Philos. Soc., XI, New Series, 1860, pp. 81, 82 (practically identical to the preceding paper).

1845. *Plestiodon chinensis* Gray. Cat. Spec. Liz. Coll. Brit. Mus., 1845, p. 92 (China, Reeves Coll.).

1864. *Mabouia chinensis* Günther. Rept. Brit. India, 1864, p. 83 (part.); Swinhoe, Proc. Zoöl. Soc. London, 1870, p. 239 (Hainan, China, south of the Yangtsze, Formosa and Pescadores) (part.); and *idem*, p. 410 (Pescadores); Boettger, Offenb. Ver. für Naturk, pp. 24, 25, 1882-1884, pp. 119, 144 (Canton, Chekiang, Formosa).

?1866. *Plestiodon quinquelineatum* Theobald. Cat. Rept. Mus. Asiat. Soc. Bengal, 1866 (extra number CXLVI), p. 25.

1879. *Eumeces sinensis* Bocourt. Miss. Sci. Mex., Rept., Liv. 6, 1879, p. 423.

1879. *Eumeces chinensis* Müller. Ver. Naturf. Ges. Basel, VI, pp. 559-709; Blanford, Proc. Zoöl. Soc London, 1881, pp. 216, 217 (specimen of doubtful locality); Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 375 (Ningpo, Chusan, Si Kiang, Canton, Hongkong); Boettger, Cat. Rept.-Samm. Mus. Senckenb. Natur. Gesell., Teil I, 1893, p. 111 (Shanghai, Hongkong, Da-lan-shan bei Ningpo, Canton); Boettger, Ber. Senckenb. Natur. Ges. Frankfort, 1894, pp. 132, 143, 146; Flower, Proc. Zoöl. Soc. London, 1896, p. 876 (thinks Blanford's [1881] specimen is from China); Stejneger, Jour. Sci. Coll., Tokyo, XII, pt. 3, 1898, p. 220 (Taipa, Formosa); Werner, Abh. K. Bayer-Stat. Akad. Wiss., II, Kl. XXII, Bd., II Abh., 1903, p. 262 (Kiangsi, Chekiang, Kuangtung, Kwangsi); Stejneger, Bull. U. S. Nat. Mus., No. 58, 1907, p. 208, fig. 185 (description); Van Denburgh, Proc. Cal. Acad. Sci., (4), III, Dec. 16, 1912, pp. 225, 226 (Shanghai); Vogt, Sitz. Ber. Ges. Naturf. Freunde, Berlin, 1914, p. 100 (Canton); Vogt, Arch. Naturg., 88 Jahr., 10 Heft, Abt. A., Dec., 1922, pp. 135-146; Smith, Jour. Nat. Hist. Soc. Siam, VI, No. 2, Oct. 31, 1923, p. 20 (Hainan); Vogt, Zool. Anz., 60, 1924, p. 338 ("Oberes Mintal, Man Tschow," Canton); Sun, Cont. Biol. Lab. Sci. Soc. China, II, No. 2, 1926, pp. 6, 7 ("Amoy up to Nanking"); Stejneger, Proc. U. S. Nat. Mus., 66, Art. 25, 1926, p. 47 (Fukien, Shanghai); Schmidt, Bull. Amer. Mus. Nat. Hist., 54, Art. 4, 1927, p. 503 (Futsing, Fukien; Yenping, Fukien; Yenchingkan, Wahnsien, Szechwan); Tchang, Bull. Fan Mem. Inst., II, No. 14, Dec., 1931, p. 277 (Nanking; southern China); Fan, Bull. Dept. Coll. Sci., Sun Yat Sen Univ., May, 1931, p. 38 (description, noting variation; Loshiang and Kutchen, Yaoshan, Kwangsi); Pope, Bull. Amer. Mus. Nat. Hist., 58, Sept. 7, 1929, pp. 384-387, fig. 2; Gee, Bull. Dep. Biol. Yenching Univ., I, 1929-1930, (Jan., 1930), pp. 53-84 (list, with records from literature); Ahl, Sitzb. Ges. Natur. Freunde, Berlin, 1930, pp. 326-331 (Kwangsi); Boring, First Ann. Rept. M.B.A.C., 1932, p. 112 (Fukien records); ?Pavlov, Pub. Mus. Hoangho Pai ho, No. 12, 1932, p. 8 ("Song Chow tchoeize, Mongolie Or le.").

1912. *Eumeces chinensis formosensis* Van Denburgh. Adv. Diag. New Rept. Amph. Loo Choo Is. Formosa, private printing Aug. 7, 1912, p. 1 (type description); and Proc. Calif. Acad. Sci., (4), III, 1912, pp. 226, 227 (type locality San Shi Ka, Formosa; other localities, Taipeh and Keelung).

History. From the literature of this species I am unable to learn the history of the type. Gray's (1838) record, "China, British Museum" is all that appears to be known, unless his notice in the Catalogue (1845) refers to the same specimen. This hardly seems likely, due to the fact that the latter Chinese specimen is colored differently. This specimen is credited to J. Reeves (Boulenger's Catalogue, 1887).

Gray bestowed the name, *Tiliqua chinensis.* The following year Duméril and Bibron (1838) use the name *Plestiodon sinense*, recognizing in the synonymy, *Tiliqua sinensis* Gray (Illus. Ind. Zoolog. Hardwick, and Cat. 1838), and *Euprepis d' Hardwick* Cocteau (Tabl. Synop. Scinc.) (I have not seen the first and last mentioned papers). They list three specimens from China, presented by the French consul, M. Gernaert, at Canton. Cantor (1842) described a Chinese skink under the name *Tiliqua rufo-guttata.* This specimen is listed by Boulenger (1887) as specimen "C. Adult, Chusan, Dr. Cantor. Type of *Tiliqua rufo-guttata.*" Schmidt (1927) offers the opinion that this should properly be regarded as a synonym of *E. pulcher.*

The Chinese skink long remained a rarity in collections, but in recent years a large number of specimens have been collected, the

largest series being that accumulated in Fukien by Clifford Pope (Pope, 1929), a series which numbered 147 specimens.

The exact relationship between this form and *pulcher* is still uncertain. The northern form *pulcher* appears to be confined to the provinces that border the Yangtze river, while the typical *chinensis* occupies the provinces to the south. Whether there is a territory between these two areas where the forms are indistinguishable from each other, is not definitely known; but the probability that such is the case seems quite likely.

Diagnosis. A large-sized skink having a somewhat typical five-lined coloration, the median light line apparently not bifurcating on the head; the dorsolateral line is continuous, arising on the supraoculars; the lateral line is broken up into spots, with other scattered light spots both above and below it.

Normally no postnasal; two pairs of nuchals, and two postmentals; the lower secondary temporal is large, more or less fan-shaped; subcaudals widened. Limbs elongate, usually overlapping when adpressed. Scale rows normally 24, rarely 22 or 26; seven upper labials (rarely 6). Frontal normally shorter than its distance from the end of the snout, in contact normally with only two supraoculars.

Description of the species. Rostral large, the part appearing above usually a little smaller than the frontonasal (rarely larger); supranasals relatively small, only very little longer than wide, in contact medially; frontonasal normally separated from frontal (rarely in contact), in contact usually with the anterior loreals (rarely separated); prefrontals normally much larger than supranasals, forming a median suture; frontal relatively short, normally shorter than its distance from the end of the snout, normally in contact with only two supraoculars (occasionally with three); frontoparietals usually larger than the prefrontals, forming a long median suture; interparietal typical, usually of smaller area than the frontoparietals, in contact with the nuchal, separating the parietals; latter scales typical, longer than wide. Normally two pairs of nuchals (frequently one or occasionally three).

Nasal rather small, apparently completely divided by a suture; normally lacking a postnasal (one rarely present); anterior loreal higher than wide, only slightly higher than the posterior; latter a little longer than high, usually touching three labials; two presuboculars; four postsuboculars (rarely five); one small preocular, followed by a diminishing series of minute scales; two small postocu-

lars, the lower larger; four supraoculars, the second proportionally very large, the first and second in contact with frontal (rarely also the third); normally eight superciliaries, the anterior about 2 to $2\frac{1}{2}$ times as large as last; upper median palpebral scales in contact with the superciliaries; lower eyelid with several enlarged plates, separated from the subocular by two granular scale rows. Primary temporal relatively small; upper secondary temporal elongate, somewhat wider posteriorly than anteriorly; lower secondary nearly or equally as large as upper, the upper end widened more than posterior, touching the primary temporal; tertiary temporal narrow, elongated, sometimes broken into two parts, occasionally entering ear.

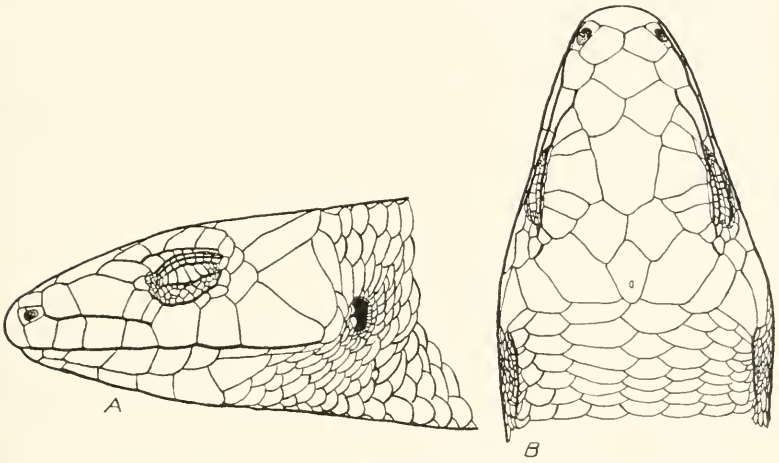

Fig. 49. *Eumeces chinensis chinensis* (Gray). K.U. No. 9095; Foochow, Fukien, China. A, lateral view of head; B, dorsal view of head. Actual head length, 21 mm.; width, 21 mm.

The scales following the upper secondary temporals lacking the uniform differentiation of these scales in the *elegans* group; seven upper labials normally (frequently six), the last of the series largest. The first is distinctly larger and higher than the three following (when only six, it may be slightly smaller than the one following); usually two postlabials, equal, or lower largest; two or three inconspicuous auricular lobules; usually six lower labials; mental moderate, with a labial border only slightly longer than that of the rostral; two postmentals, the anterior narrow; three pairs of chinshields; a large postgenial, the scales bordering inner edge much longer than wide; ear rather small, surrounded by 18-20 scales.

Scales around the neck behind ear, 32-34; around narrow part of

neck, 26-29, 28 appearing most frequently; scales around body, 22-26, normally 24. Subcaudals widened, about 90 from vent to tip of tail; eight preanal scales, the medians enlarged, the laterals diminishing in size, the outer overlapping inner; the lateral postanal not or but slightly differentiated, lacking all trace of a keel.

Limbs large, well-developed, overlapping a few millimeters when adpressed; thirteen or fourteen scales about the insertion of forearm; a pair of well differentiated wrist tubercles; a group of at least six padlike palmar tubercles, the posterior largest; lamellar formula for fingers; 5; 9; 12; 11; 6. About 18 scales around insertion of hind limb; no trace of a patch of enlarged, differentiated scales on posterior part of the femoral region; two pairs of large padlike heel plates, the posterior of each pair largest, sometimes separated; the enlarged tubercles tend to arrange themselves longitudinally in two rows passing toward the base of the fourth finger. Lamellar formula for the toes: 5; 9; 12; 17; 9; intercalated row of scales on fourth toe only on basal phalanx; terminal lamellae not tightly bound about claws; a group of small axillary scales, these usually imbricate; no small scales behind the insertion of hind leg.

Color (in alcohol). Young (snout to vent, 45 mm.), dark blackish with a median cream or white line from posterior part of the interparietal. Dorsolateral line begins on the last supraocular, and follows the edges of the second and third scale rows onto the tail, continuous (or very rarely broken); anteriorly the edges of the first and second scale rows with lighter edges, not appearing as a line; upper and lower labials with cream dark-edged spots, also one on the tertiary temporal; on top of head each scale with a brown area, these areas bordered with black; sides with three rows of cream or white spots extending to the ear, each spot covering one or two scales. Tail bluish; chinshields light, edged with slightly darker color; throat, breast, and undersurface of limbs light; belly grayish.

In older specimens there is a diminution in the distinctness of the light lines until, in the male specimens, the color becomes olive, brown-olive, or brown, and all trace of the juvenile pattern is obliterated. In these older specimens the head tends to become a uniform yellow-brown (reddish in life). There is usually a darker lateral stripe that may be more or less continuous, but which grows less distinct as older age is reached, until practically no trace is left, or it may form disconnected, irregular, dark spots; in this darker area, traces of the lateral light spots may persist for many years and in males many of the scales become reddish, especially

in the neck region. In females the lines are retained a little longer, and in old age, when the lines are lost, often the scales on the back retain darker edges.

Measurements of *Eumeces chinensis chinensis* (Gray)

Museum Number Sex	M.C.Z. 29001 ♂	M.C.Z. 29007 ♂	M.C.Z. 29005 ♂	M.C.Z. 29008 ♀	M.C.Z. 29003 ♂	M.C.Z. 29004 ♂	M.C.Z. 29002 ♂	M.C.Z. 29006 yg.
Snout to vent	119	108	108	104	105	96	74	45
Tail								
Snout to foreleg	39	34	36	33	32	31	23	16
Snout to eye	9.5	9	9	8	8.5	7	5.6	.5
Snout to ear	25	22	22.5	18.6	18.2	18	14	9.5
Axilla to groin	62	56	53	53	55	53	41	23
Width of head	19	18	18	15	18	15	11	8
Length of head	21	18.5	19	16.2	20	15	18	9
Width of body	21	22	19	21	20	19	16	9
Foreleg	28	26	25	26	26	25	20	12
Hind leg	41	36	33	34	36	33	26	17
Longest toe	13	12	11	12	11	11	10	5

All specimens from Fung-li, Chekiang, China.

Variation. As is expected, *Eumeces chinensis* varies considerably in the details of squamation, but the percentages are such that the norm of a character is easily discerned. One difficulty has obtruded itself, and that is the lack of certainty in the determinations of forms reported in literature. Fortunately Mr. Pope's large series was available for study and it was possible to arrive at a rather accurate estimate of variation obtaining in Fukien Province. Little that is new is added to the already published data of Schmidt (1927) and Pope (1929) on this series.

Scale counts are available on 204 specimens. Of these, 182 have 24 rows about the middle of the body; 2 have 23; 5 have 25; and 15 have 26. Malcolm Smith (1923) notes 22 rows on a specimen from Hainan. The variation in the scales in middorsal rows from parietals to above the vent is from 50 to 55, the numbers 51-53 occurring with greatest frequency. In about 200 specimens examined, a postnasal occurs on one or both sides only 12 times, and the postmental is single in only 8 cases. The second postmental in 10 cases was abnormal, either vertically split, or united to one or the other of the chinshields. The nuchals were normally 2-2 in about 77 percent of the cases, the remainder had the nuchals 2-1

or 1-1. The constancy of the prefrontal suture (separating frontonasal and frontal) is greater than in all other species of which large series are available, except *Eumeces laticeps*. The number of supraoculars touching the frontal shows great instability; two touch the frontal more frequently than three, the percentage being approximately 64 and 36, respectively. Detailed counts of subdigital lamellae of the fourth toe were not made on all of the specimens, but in some fifty specimens the number 16 occurred in 72 percent and 17 in about 18 percent. The limbs touch or overlap when adpressed in practically all specimens. However, if the specimen is stiffened or shrunken, they may fail slightly to touch. The limbs are longer in the young in proportion to the axilla to groin distance.

A few other scales showed an occasional tendency to split. In four specimens one or both prefrontals were broken. The tertiary temporal was segmented in several cases. On the whole the temporals were very constant, as was the presence of the single pair of postlabials. The superciliaries were usually eight or nine, eight predominating.

Fan (1931) reports on 21 specimens from Yaoshan (Loshiang and Kutchen) in which nine have a postnasal on both, three on one side. His statement "usually 5-5 supraoculars" is probably an error due to counting the last superciliary.

Remarks. In the collection of the Academy of Natural Sciences, Philadelphia, is a specimen purporting to be from Java. The specimen is old and accurate measurements could not be made. There were but 48 scales from parietals to above vent, and but 22 scale rows about the body. In other characters discerned it appeared to be typical. The locality I believe is erroneous.

The absence of large series from the more western provinces makes it difficult to estimate the true relationship of this form with *Eumeces chinensis pulcher*. In Chekiang both forms occur. Those in the northern part along Hangchow bay appear to have the typical adult coloration of *pulcher*, while those in the central and southern parts are typically *chinensis*. One specimen from Kangpu or Wusung, Hangchow Bay (U.S.N.M. 72916, Sowerby Coll.) has limbs which overlap the length of two scales; while in other typical *pulcher* the limbs are relatively shorter and fail to overlap save in the very young.

The status of Cantor's *Tiliqua rufo-guttata* is likewise in doubt. It comes from an island in the Chusan archipelago lying off the Chekiang coast, and might be either *chinensis* or *pulcher*.

Mr. Clifford Pope, who is personally familiar with the habitats of the two forms, suggests that *chinensis* is a typical mountain form, while *pulcher* is a plains, open field, or river valley form. However, Sun (1926) reports specimens from near Nanking (presumably *pulcher*) from the slopes of Purple Mountain. Schmidt (1927) suggests that future investigations may prove the two worthy of only subspecific rank.

Distribution. In general this form is confined to the southeastern third of China. There are, so far as I know, not any records of the

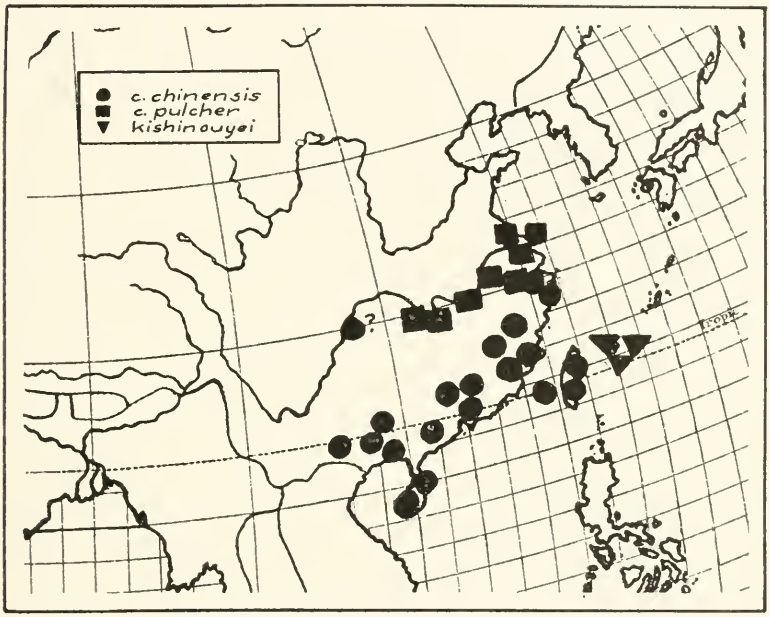

FIG. 50. Distribution of the species of the *Obsoletus* group, in Eastern Asia.

species in Kweichow or Yunnan, nor authentic records in provinces lying to the north of those provinces in the valley of the Yangtze river. Many literature records are omitted here, due to the uncertainty of identification.

Locality records:

CHINA: (Brit. Mus. 2).

Kwangsi: (Ahl, 1930) (Werner, 1903, 17 spec.); Yaoshan (Fan, 1931, 21 spec.).

Kwangtung: (Werner, 1903, 10 spec.); Hongkong (Boettger, 1893) (Brit. Mus. 3); Lilong (Boettger, 1882); Sikiang (Brit. Mus. 1); Canton (Vogt, 1924) (Mell, 1922) (Boettger, 1894) (Brit. Mus. 1); Hainan (Boettger, 1894); Hainan, The Hummocks, 25 km. from Hoi-hao (Smith, 1923, 1 spec.).

?*Szechwan:* Yenchingkau, Wahnsien (A.M.N.H. 1); "Man Tschow" upper valley of Min river (Vogt, 1924, 2 spec.).

Kiangsi: (M.C.Z. 1, Gordon Coll.).

Fukien: (A.M.N.H. 5) (Field 1); Futsing Hsien (A.M.N.H. 38) (U.S.N.M. 3); Yenping (A.M.N.H. 90); Yenping fu (U.S.N.M. 25) (M.C.Z. 9); Ch'ungan Hsien (A.M.N.H. 6); Hokow (A.M.N.H. 13); Yoochow (U.S.N.M. 2) (K.U. 4); Kuliang (U.S.N.M. 1); Fuching Dist. (U.S.N.M. 3); Amoy (Field 1); Kuatun (Field 1).

Chekiang: Ningpo (Boettger, 1894) (Brit. Mus. 2); Chusan (Brit. Mus.; type *Tiliqua rufo-guttata*) (A.N.S.P. 2); Da-lanshan near Ningpo (Boettger, 1893); Tung li (Mich. 1) (U.S.N.M. 9) (M.C.Z. 8); near Mo Kan Shan (Mich. 1).

Pescadores Islands: ?(Swinhoe, 1870). (I am unable to identify Pavlov's [1932] locality "Songchow Tchoeize, Mongolie Or le.")

Formosa: San shi Ka (type locality of *formosensis*) (C.A.S. 1); Keelung (C.A.S. 2); Taipeh (C.A.S. 1).

Eumeces chinensis pulcher (Duméril and Bibron)

(Plate 25, Fig. 1; Figs. 50, 51)

SYNONYMY

1839. *Plestiodon pulchrum* Duméril and Bibron.* Erp. Gén., V, 1839, pp. 710, 711 (type description; type locality "China"); Gray, Cat. Liz. Brit. Mus., 1845, p. 92 (China; J. Reeves Coll.).

1842. ? *Tiliqua rufo-guttata* Cantor. Ann. Mag. Hist., IX, 1842, p. 482 (assignment here not certain; type not examined).

1879. *Eumeces pulchra* Bocourt. Miss. Sci. Mex., Liv. 6, 1879, p. 423.

1927. *Eumeces pulcher* Schmidt. Bull. Amer. Mus. Nat. Hist., LIV, Art. 4, Oct. 11, 1927, pp. 503-505 (rehabilitation of the name *pulcher* for the northern Chinese form, with a comparison of this form with typical *chinensis*); Gee, Bull. Dept. Biol. Yenching Univ., 1, 1929-'30 (Jan., 1930), p. 63 (Hunan, Anhwei).

History. The specimen described by Duméril and Bibron was obtained from the British Museum ("L'échantillon dont il est ici question provient du Musée Britannique; il nous a été donné comme originaire de Chine") and may very probably have been one of the series collected by J. Reeves, which likewise bears only the locality record "China."

The original description states:

"Le Beau Plestiodonte. *Plestiodon pulchrum.* Nobis.

"Caractères. Pas de plaques fréno-nasales; oreilles vertico-ovalaires, grandes, sans lobules à leur bord antérieur; parties supérieures noires; trois lignes dorsales blanches."

Description:

"Formes: C'est avec doute, nous l'avouons, que nous inscrivons ici cette espèce sous un autre nom que celui que porte le Plestiodonte† décrit dans

* Both Duméril and Gray refer to the synonymy *Tiliqua pulchra* Gray, Mus. Britain. (non Illus. Ind. Zoöl.), a reference I have not traced. It presumably antedates Duméril and Bibron's name, but whether a *nomem nudum* I do not know. They also place in synonymy *Tiliqua de Gray* Coct. (Synopt. Scinc.).

† *Plestiodon quinquelineatum.*

l'article précédent; car elle n'en diffère que par l'absence de plaques frénonasales et de lobules ou de petites écailles flottantes de long du bord antérieur de son orifice auriculaire.

"Coloration: Quant à son mode de coloration, il serait le même sans deux raies blanches latérales de moins. L'individu que nous avons maintenant sous les yeux, et qui est en tous points semblable à un second que nous avons observé dans le muséum royal d'Histoire naturelle de Londres, a le bout du museau blanc et les plaques qui le revêtent en dessus et latéralement, ainsi que les sus-oculaires de la même couleur, mais bordées de noir. La ligne blanche de son dos ne dépasse pas l'occiput. C'est certainment un jeune sujet. En voici les principales dimensions."

"Dimensions: *Longueur totale*, 8″ 1‴; *Tête*, long., 8‴; *Cou*, long., 5‴; *Tronc, long.*, 2″; *Memb. anter.*, long., 1″; memb. poster., long., 1″ 4‴; queue, long., 4″ 8‴."

That the authors compared the species with "*quinquelineatum*" rather than with their *Plestiodon sinensis* is due to the fact that the type of *P. pulchrum* is a young individual with juvenile coloration, while the available specimens of their *Plestiodon Sinense* (three from China) all appear to have been adults and lacking juvenile markings.

Four years later Cantor (1842) described a skink from the island of Chusan as *Tiliqua rufo-guttata* as follows: "Bronze-colored above, with four black zigzag lines; the sides pale yellow, with numerous red spots. Beneath pale yellow."

Bocourt (Mission Sci., Liv. 6, 1879, p. 423) accepts the two species, separating them in his Tableau synoptique (p. 423) on the basis of a single postmental scale in *pulchra* and a double postmental scale in *sinensis;* and on the differences in coloration.

Boulenger (1887) placed *rufo-guttata*, *pulchrum* and *chinensis* in the single species, *Eumeces chinensis* (Gray).

Schmidt (1927) on the basis of a series of seven specimens collected in China by Clifford Pope, reëstablishes the name *pulcher* for the large skink occurring in the provinces of Hunan and Anhwei. He shows that, save for the color differences, the basis of separation is average scale differences. He states, "This series differs from the Fukien *chinensis* in a number of characters, each insufficient if taken alone, to warrant the distinction of a species (or a subspecies) but amounting to conclusive evidence when taken together."

Besides the series studied by Schmidt, I have had available for study four specimens in the United States National Museum: Nos. 31720 Shanghai, 67034 Suchow, Kiangsi, 73187, twenty miles west of Shanghai, and 72916 Kangpu or Wusung, Hang Chow Bay.

From my study I feel that the more northern form of *Eumeces*

chinensis is worthy of recognition, but believe it wiser to assign it subspecific, rather than specific, rank. Schmidt (1927, p. 505) himself regarded this as a probable relationship.

Diagnosis. Closely related to *Eumeces chinensis chinensis* (Gray), having practically the same growth pattern and adult size, but having three as the normal number of supraoculars touching frontal (rarely two); the number of upper labials normally six (seven occurring occasionally). The adult females retain to a large extent the juvenile color pattern (less distinct and occasionally partly obliterated in males).

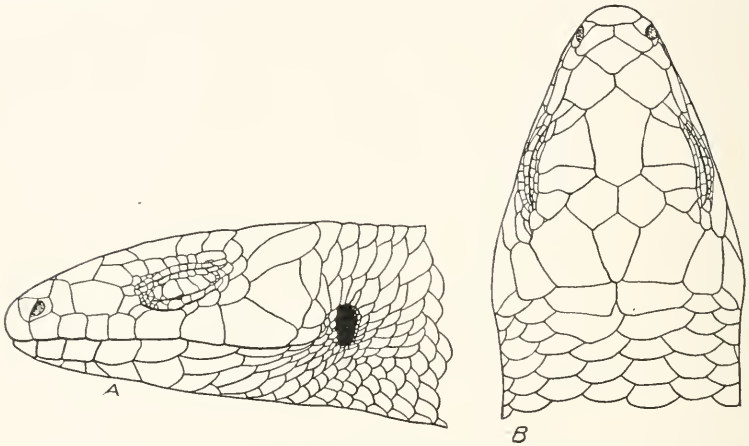

FIG. 51. *Eumeces chinensis pulcher* (Duméril and Bibron). C.A.S. No. 14662, Shanghai. A, lateral view of head; B, dorsal view of head. Actual head length, approximately 11 mm.; width, about 10 mm.

Description of species (drawn from Field M. Nos. 7185 ♂ and 7186 ♀, Ningkwo, Anhwei, China). Portion of rostral visible above half the size of the frontonasal; supranasals relatively short and wide, forming a median suture; frontonasal broader than long, in contact with the anterior loreal; prefrontals moderately large, forming a strong median suture; frontal only slightly narrower posteriorly than anteriorly, touching three supraoculars (abnormal in 7186, where the supraoculars are fused and broken on the right side while the third supraocular on the left side is minutely separated from frontal); frontal as long as its distance from end of snout; frontoparietals about same size as prefrontals, forming a median suture; parietals moderate in size, not enclosing the interparietal; nuchals two pairs (in the male there are three on left side).

Nasal at least partially divided by a suture, the anterior part smaller than posterior part (including nostril); no postnasal; an-

terior loreal higher than wide, higher than second, broadly in contact with first and second labials; posterior loreal moderate, its greatest height usually less than its length, touching two (rarely three) labials; two presuboculars; four postsuboculars; a small preocular, followed by three granules diminishing in size; seven superciliaries, the anterior largest, often as large as first supraocular; last of the series about half as large as first; two small postoculars, the lower largest; upper median palpebral scales in contact with the superciliaries; four enlarged plates on the lower lid, separated by about three rows of granules from the subocular, the lower row relatively much enlarged; four supraoculars, three normally touching the frontal; primary temporal moderate, longer than wide; upper secondary large, the main axis of the scale diagonal; lower secondary triangular; tertiary small; six (or less frequently seven) upper labials, three (or four) preceding the subocular; first distinctly higher than other scales preceding the suboculars; last labial largest, usually much longer than high, separated from ear by a rather large postlabial, upon which is superimposed one (rarely two) smaller scales; five lower labials; mental with a slightly larger labial border than rostral; two postmentals (the second scale broken in the female); three pairs of chinshields, the first pair in contact; a well-developed postgenial, bordered on its inner edge by a scale longer than wide.

Scales on body in parallel rows except in axilla; the median pair on back usually a little larger than adjoining row; 31 scales about neck behind ear; narrow part of neck, 27; around body at axilla, 31; around middle of body, 23-24 rows; 17 scales about base of tail. Pits on scales distinct, numerous behind ear, sides of neck, on arm and about arm insertion and axilla, on upper and posterior side of femur and behind insertion of hind leg; 16 scales around insertion of arm; two well-developed wrist tubercles; palm with six or eight enlarged padlike granules; lamellar formula for fingers: 5; 9; 11; 10; 7. Eighteen scales around insertion of hind limb; four padlike heel tubercles with two small conical tubercles on sole; lamellar formula for toes: 6; 9; 12; 16; 10; no granular scales behind insertion of the hind leg; an intercalated row of scales on digits extending nearly half the length of toes on outer side, elsewhere seldom extending beyond basal phalanx; toes strongly compressed; eight preanal scales, the median much enlarged, diminishing in size on sides, the outer scales overlapping inner; ear rather small, surrounded by about 20 scales.

Measurements of *Eumeces chinensis pulcher* (Duméril and Bibron)

Museum Number Sex	A.M.N.H. 31226 yg.	A.M.N.H. 23557 ?	Field 7186 ♀	U.S.N.M. 31720 ♀	U.S.N.M. 72916 ♂	U.S.N.M. 67034 ♀	U.S.N.M. 73187 ♀	A.M.N.H. 31205 ?	A.M.N.H. 31207 ?	A.M.N.H. 31203 ?	Field 7185 ♂
Snout to vent	51	85	89	97	98	101	102	108	110	113	115
Snout to eye	.....	.....	6.8	7.5	6	7.4	6	.....	.....	.....	9
Snout to ear	.....	.....	16.4	18	17	18.2	17.5	.....	.....	.....	25
Snout to foreleg	19	26	31	29	32	33	32	34	33	40	40
Axilla to groin	.....	.....	51	50	53	55	53	.....	.....	.....	65
Length of head	8.2	12	14	15.3	18	15	15.5	.....	.....	.....	21
Width of head	7	11	12.5	14.2	16	13	13.5	14	14	22	20
Foreleg	12	21	15	24	25	22	25	22	23	25	18
Hind leg	17	25	19	32	31	30	32	29	30	33	26
Longest toe	7	12	9.5	11	11	10	11	12	12	14	11

Measurements taken on the American Museum specimens were recorded by May Danheim Burt.

Numbers 31226, 31203, 31205, 31207, Chen Tzu or Ningkwo; No. 23557, Huping College, Yochow, Hunan Prov.; Nos. 7185, 7186, Ningkwo, Anhwei; Nos. 31720, 73187, near Shanghai; No. 67034, Suchow, Kiangsi; No. 72916, Kangpu or Wusung, Hangchow Bay.

Color. Male dark olive above, each scale showing a lighter, bronzy, posterior edge; sides with numerous deep black spots, each less than half a scale in size, frequently contiguous; sides, below dark region, bluish-gray, with lighter scales intermixed which appear to have been reddish in life; snout and sides of head generally amber color; limbs generally like body, with small black and light flecks, especially on proximal portion. Ventral surface generally light, some of the scales of abdomen showing darker on anterior edges of scales.

Female with three dim light stripes on back, olive in color, each edged by rows of black dots; lateral line represented by a few disconnected light spots; scales on side of head edged more or less with brown; dark stripes on side more distinct than in male. Tail colored like dorsal surface of body.

Variation. The number of scales around the middle of body varies from 24 to 26 rows; 24 occurring eight times; 25, once; 26, twice. The scales around the neck vary from 26 to 28; 26, four times; 27, twice; and 28, five times. The upper labials are six or seven. Counting both sides, six occurs fifteen times while seven occurs seven times; the nuchals are normally 2-2, three occurring on one side in two cases. Supraoculars are three or four; counting both sides: three occurs four times; four occurs 18 times. Invariably two postmentals are present; a postnasal occurs on one side in one specimen. The frontonasal is either broader than long or equally as broad as long. The frontonasal is in contact with frontal in a single case. Supraoculars touching frontal are either two or three; three occurring fifteen times, two occurring seven times.

In color the variation has to do chiefly with age, the younger the specimen, the more closely is juvenile coloration approached. A young specimen of *pulcher,* when compared with the young of typical *chinensis,* shows the following differences: The dorsolateral line is broken throughout its length instead of being continuous; the rounded labial spots are nearly surrounded by dark color; much less so in *chinensis.* Pits on scales are smaller and spread over a wider area on edge of scale; in *chinensis* fewer, and more segregated; light spots present on frontoparietal. The granular scale rows on the lower eyelid distinctly larger than in *chinensis.* In life the red lateral coloration is probably more pronounced in *pulcher* than in *chinensis.*

Remarks. The exact type locality of neither of the two forms is

known, but it is highly probable that the typical specimens of *chinensis* were collected on the coast near Hong Kong in the vicinity of Canton; while that of *pulcher* may have come from Shanghai.

Distribution. It is uncertain just how sharp the line of demarcation is between the northern and southern forms of this Chinese species. The northern specimens of *chinensis pulcher* all appear to have been taken in the lowland regions of the valley of the Yangtze river. It seems probable that certain literature records of *Eumeces chinensis chinensis* actually belong to the northern form. (See fig. 50 for distributional map.)

Locality records:

CHINA: (type, N.H.M.P. 1).

Kiangsu: Shanghai (C.A.S. 1) (U.S.N.M. 1); 20 miles west of Shanghai (U.S.N.M. 1); Kangpu or Wusung on Hangchow Bay (U.S.N.M. 1).

Kiangsi: Suchow (U.S.N.M. 1).

Hunan: Huping College, Yochow (A.M.N.H. 1).

Anhwei: Ningkwo (Field 2) (A.M.N.H. 4).

Eumeces kishinouyei Stejneger

(Plate 26; Figs. 52, 53, 50)

SYNONYMY

1901. *Eumeces kishinouyei* Stejneger. Proc. Biol. Soc. Wash., XIV, pp. 190, 191 (type description; type No. 22, Science College Museum, from Islands of Yayeyama Group, Riu Kiu Archipelago); and Bull. U. S. Nat. Mus., 58, 1907, pp. 210-213, figs. 186-189 (top, ventral, and lateral view of the head, and underside of foot) (gives type locality as Miyakoshima, Sakishima group; Tashiro, collector); Barbour, Proc. New Eng. Zoöl. Club, IV, 1909, p. 64 ("Ishigakishima"); Van Denburgh, Proc. Cal. Acad. Sci., (4), 1908-'13 (1912), pp. 227, 228 (Miyakoshima and Ishigakishima).

History. From material loaned by the Science College Museum, Tokyo, Stejneger in 1901 described this form briefly, naming it for Dr. K. Kishinouye of the Imperial Fisheries Bureau, Tokyo. The type locality is Miyakojima, of the southern Yayeyama group of the Riu Kiu (Loo Choo) chain which lies close to the large island of Formosa. The type is No. 22, Science College Museum, Tokyo, Japan.

Stejneger later (1907, p. 210, figs. 186-189) described the species more fully, giving a detailed study of a series of specimens from the Yayeyama group, discussing its relationship with other related forms and publishing line drawings of the head. Van Denburgh (1912, pp. 227-228) reported on seven specimens from the same group: five from the type locality; two from the near-by island Ishigakijima, from which place Stejneger had already listed specimens.

The form is one of the largest species of the genus and, as pointed out by Stejneger, is closely related to *Eumeces chinensis*.

Diagnosis. Characterized by a seven-lined pattern; head with a pair of dim lines which join on the frontoparietal; a continuous dorsolateral line from the anterior supraocular, a lateral line, broken into dots on labials and neck, continuous on the side, and a sublateral line broken into separate spots anteriorly. The pattern is retained by females until old age; it is less distinct or obsolete in old males. No differentiated postfemoral scutes; no well-differentiated lateral postanal scute; normally a postnasal and two post-

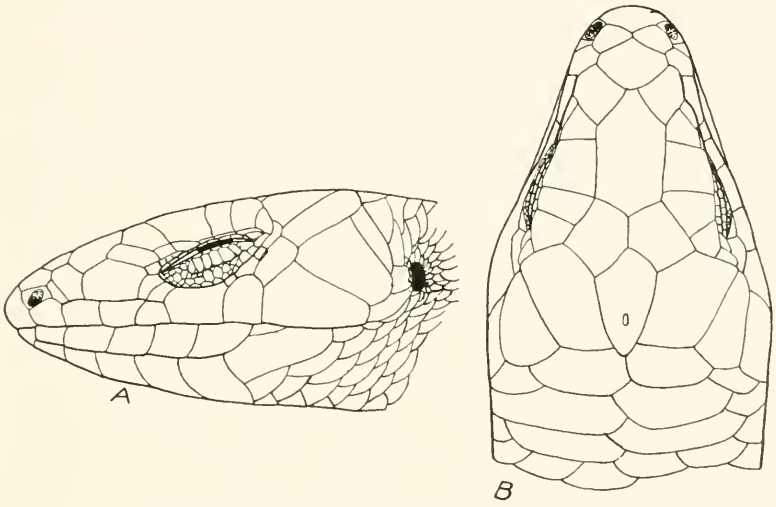

FIG. 52. *Eumeces kishinouyei* Stejneger. After Stejneger (1907, figs. 186, 187). Sci. Coll. Mus. Tokyo, No. 22; Miyakoshima, Sakishima group, Riu Kiu Islands, Japan. A, lateral view of head; B, dorsal view of head. Actual head width, 24 mm.

mentals; 24-26 scale rows; two or three pairs of nuchals; outer preanals overlap inner; subcaudals widened; intercalated lateral lamellae on fourth toe not extending to the three distal joints; limbs overlapping, when adpressed, nearly the length of the fourth toe.

Description of species (drawn largely from topotypes). The portion of the rostral visible above equal to one half to two thirds the area of the frontonasal; supranasals forming a median suture, their greatest width about two thirds their greatest length, touching the postnasal laterally; frontonasal very variable in size, usually broader than long, in contact with the first loreal laterally; prefrontals moderate, forming a median suture, usually separating the frontonasal from frontal, forming a wider suture with the second

loreal than with the first, the suture with first supraocular not much greater than that with the first superciliary; frontal somewhat wider anteriorly than posteriorly, as long as or very slightly longer than its distance from the end of the snout, not or very slightly constricted medially, usually touching three supraoculars (rarely only two); frontoparietals usually elongated, large, exceeding the interparietal in area, forming a median suture usually more than half their length; parietals large, typical, narrowly separated posteriorly; interparietal narrowly pointed behind, its length exceeding its width.

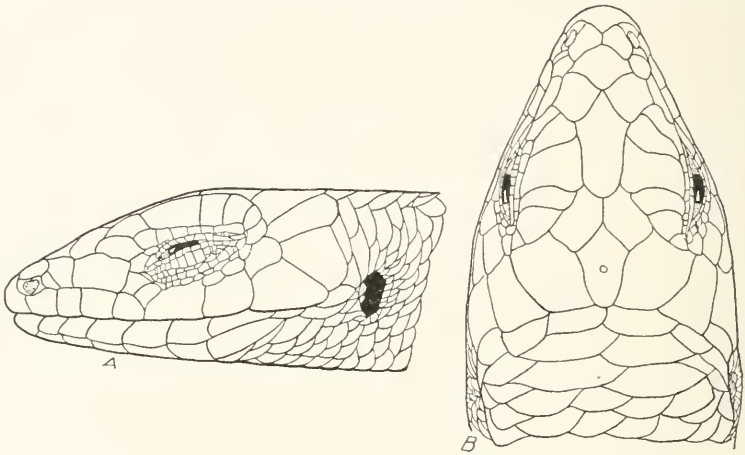

FIG. 53. *Eumeces kishinouyei* Stejneger. C.A.S. No. 21724, Ishigaki-jima, Riu Kiu Islands, Japan. A, lateral view of head; B, dorsal view of head. Actual head length, 15 mm.; width, 12 mm.

Nasal moderate, very distinctly divided, the anterior part large and triangular, posterior part small, narrow; the nostril large, the greater part anterior to a vertical line drawn from the labial end of the suture between rostral and first labial; postnasal usually present; first loreal much higher than second; second much longer than high, sometimes approaching once and two thirds as long as high; two presuboculars; one preocular, slightly above corner of eyelids, followed by a second smaller scale; posterior corner of eyelids terminating between the two small postoculars; median upper palpebral scales in contact with superciliaries; four (rarely five) postsuboculars; usually five enlarged, opaque plates on lower eyelid, separated from subocular by three rows of small scutes; seven upper labials, the last largest, four preceding the subocular, the first highest and of an area equal to, or only slightly less than, that

of any of the other three; sixth no larger in area than fifth (suboocular); primary temporal elongate, sometimes nearly one and one half times as long as wide, touching both secondary temporals; upper secondary only slightly widened posteriorly; lower secondary larger in area; tertiary small, scarcely differentiated from the supraauricular scales, separated from ear by a postlabial reaching to the edge of ear, separated from ear lobules by a very small preauricular scute, forming equal sutures with seventh labial and lower secondary temporal; second postlabial superimposed above the posterior end of lower postlabial, separating the lower secondary temporal from the ear; four supraoculars, usually three touching frontal; seven superciliaries, the anterior three times the size of second; last, second in size; two or usually three pairs of nuchals.

Mental normal, its labial extent slightly greater than that of rostral; two postmentals; three pairs of chinshields, the third pair widest transversely; third pair followed by a greatly elongated postgenial, bordered on its inner side anteriorly by a small elongate scale.

Eighteen to twenty-two scales about ear opening; median dorsal series of scales widened, somewhat larger than lateral scales; dorsal and lateral scales of adults usually show five very dim striae which follow on the surface of the scale above the longitudinal canals in the scales; scale rows immediately behind ear, 28-30; narrow part of neck, 26; 32 rows, five mm. behind insertion of arm; 24 rows about middle of belly; some of the lower, intercalated axillary scale rows extend back to near middle of body; about 17 rows about base of tail; 47 scales in a row from parietals to above anus; subcaudal series strongly widened transversely; lateral postanal not or scarcely differentiated; six preanals, the median greatly enlarged, the two outer pairs differentiated; the outer scales overlapping inner; head normal or somewhat widened (old male); limbs long, the adpressed hind limb reaching elbow of the adpressed forelimb; toes relatively short; two strongly differentiated wrist tubercles and twelve large palmar pads more or less contiguous; lamellar formula for fingers: 5; 8; 10; 10; 7; usually two pairs of padlike scutes on heel, separated medially by small granules; lamellar formula for toes: 6; 8; 13; 17; 11; a series of enlarged padlike subimbricate or conical scales from heel to base of fourth toe, and a similar row to third toe; the intercalated series of scales between dorsal and ventral lamellae of the fourth toe, on basal joint only; a small group of granular axillary scales; sometimes a single row of granules behind insertion of hind leg.

Color: Young (84 mm.). Dorsal coloration olive-brown, the scales showing some darker areas where they adjoin white (or cream) lines. A median light line from first nuchals to some distance on tail. This seems to divide and dimly connect with two dimly defined lines which follow the lateral frontal sutures and join on the frontoparietal; dorsolateral light line begins on the anterior superciliary, follows the third scale row, occupying a half of the area (sometimes encroaching on the outer edge of the second scale row), continuing on tail for two thirds or more of its length. A series of irregular cream spots on labials back of ear to above arm, where they now form a continuous lateral series which extends along the fifth or edges of the fifth and sixth scale rows; a deep brown lateral stripe between the dorsolateral and lateral lines, darker on the outer edges; a sublateral brown stripe, bordered by a series of cream spots or a continuous line, is usually evident; ventral surfaces dull cream.

In adult females the color is more olive, the darker areas on the scales tending to form distinct lines. In the larger males the lines become almost obsolete, the brown lateral stripe represented by a few, darker, scattered spots.

Variation. Twelve specimens of this species have been available and a study of them confirms the fact that, while certain differences exist between specimens from different islands, the number of speci-

Measurements of *Eumeces kishinouyei* Stejneger

Museum..... Number..... Sex.....	U.S.N.M. 34080 ♂	U.S.N.M. 34081 ♂	C.A.S. 21722 ♀	C.A.S. 21720 ♀	C.A.S. 21726 ♀	A.M.N.H. 21226 ♂	C.A.S. 21719 ♂	C.A.S. 21721 ♂	C.A.S. 21724 ♀
Snout to vent...	164	140	134	131	125	116	96.2	82	80
Tail.....	198	102	133	.....	.....	104	.....	131	.....
Snout to eye....	.....	12	10.2	9.5	9	11	7.7	7	7
Snout to ear....	39	30	25.2	24	25	26.2	18	17	16.2
Snout to foreleg..	55	45	38	35	39	37	31	27	27
Axilla to groin...	78	73	73	67	65	63	45.5	43	36
Width of head..	34	28	18	20	20	24	14	11	13
Length of head..	31	26	23	22	21.5	22	17	15.5	15
Width of body..	.....	30	27	23	22	.....	15	15	16
Foreleg.....	45	40	35	34	33	34	25.5	22	22
Hind leg.....	61	53	50	50.5	47	45	37	34	31
Longest toe.....	21	18	15.2	15.2	16	19	14	11	11.5

Nos. 34080, 34081, 21724, 21726 are from Ishigakijima; No. 21226 is from Yonakunijima; Nos. 21719, 21720, 21721, 21722 are from Miyakojima.

mens is so small, and the differences of such a character, that no subspecific separations seem warranted.

A specimen from Yonakunijima (A.M.N.H. 21226, snout to vent measurement 116 mm.) has the head width exceeding the length by two millimeters, a condition that appears only in very old males. That this specimen is senile is evidenced by the shrivelled condition of the testes. A male from Ishigakijima (132 mm.) shows the head slightly wider than long, but in an older male from the same island (164 mm.) the head width exceeds the length by four millimeters.

It would appear that the Yonakunijima specimens never attain the size of specimens on Ishigakijima or Miyakojima. Of five specimens from Miyakojima, three lack the postnasal, although one of the three has a part of the posterior nasal partially separated. In all other specimens the postnasal is normally present. The number of nuchals is either two or three, the numbers 3-3 occurring three times, 2-2 three times and 3-2 six times. There are two postmentals. However, in two specimens from Miyakojima the second postmental is vertically split, and in one of the two specimens, fused on one side with the first pair of chinshields. The superciliaries vary between seven and nine, the numbers 7-7 occurring twice, 7-8 twice, 8-8 five times, 7-9 once, and 8-9 once. In three specimens the frontonasal is in contact with the frontal. The usual number of supraoculars touching the frontal is three, the numbers 3-3 occurring nine times; 2-2 twice; 3-2 once.

The number of subdigital lamellae on fourth toe varies between 15 and 18, the numbers 15 occurring once, 16 nine times, 17 twelve times and 18 once.

Very little variation occurs in the character of the temporals. In one specimen the upper secondary is considerably enlarged and the tertiary broken into two scales.

Remarks. My reasons for recognizing this form as a species distinct from *Eumeces chinensis* are based on the fact that the species is much larger (largest specimen in 198 *Eumeces chinensis*, 127 mm.; largest *kishinouyei* 164 mm.); the dorsal scales tend to develop striations in the adults; the pitting on the lateral scales is very much more strongly pronounced; the limbs are distinctly longer, overlapping, usually, nearly the length of the fourth finger; the presence of a seven-lined color pattern in the young, with a pair of curving lines on the head, more or less continuous with the median line, and the retention of this pattern throughout the greater part of the

individual's life; and the presence normally of a postnasal scute. However, *kishinouyei* is allied more closely to *chinensis* than to any other known species.

Distribution. The species as here defined appears to be confined to the Yayeyama and Miyaka groups of the Riu Kiu Islands, these the southernmost islands of the chain, lying close to Formosa. Specimens are known from the larger islands. (See Fig. 50 for distributional map.)

*Locality records:**

Miyakojima: (Science College Tokyo 2, including type) (C.A.S. 5).
Ishigakijima: (C.A.S. 2) (U.S.N.M. 2) (M.C.Z. 1).
Iriomotejima: (Science College Tokyo 3).
Yonakunijima: (A.M.N.H. 2).

MULTIVIRGATUS GROUP

To this group I assign five small species extending from Nebraska southwest to Nayarit, Mexico, including Sinaloa, Sonora, Arizona, Colorado, New Mexico and Chihuahua.

The color pattern in the group is very variable, ranging from a most elaborately marked species, *multivirgatus,* to the uniformly olive-colored *humilis;* in a third a median line is wanting and the dorsolateral and lateral light lines are well defined (*gaigei*).

That none of these forms are color varieties or subspecies may be affirmed since their ranges overlap and three may occur in the same general area (*humilis*, *multivirgatus*, and *gaigei* from Guadelupe Mts.).

With the exceptions of *multivirgatus*, all are quite rare in collections, each being known from one or only a few specimens.

The group may be characterized as small or medium-sized members of the genus, of variable coloration and marking; parietals usually not enclosing interparietal (enclosed in *parvulus*); one (or no) postnasal; postgenial bordered by a scale longer than wide on the inner margin; the limbs, barely touching in the young, are widely separated in adults; postmental single or double.

KEY TO THE SPECIES OF THE MULTIVIRGATUS GROUP

A. Postmental single.
  B. No postnasal present; young with at least short dorsolateral and lateral lines; palpebrals and supercilliaries in contact generally; the primary temporal large, approaching size of the upper secondary temporal.
    C. Parietals enclose interparietal; 24 scale rows; scales bordering ear do not overlap it; max. size, 51 mm. (Western Mexico).
      Eumeces parvulus Taylor, page 363

* The spelling of these names is the same as that in Okada, The Tailless Batrachians of the Japanese Empire, 1931.

CC. Parietals not enclosing interparietal; scales bordering ear overlap it; 20 scale rows; max. size known, 47 mm. (probably grows larger). (Sonora, Mexico).....*Eumeces parviauriculatus* Taylor, page 368

BB. A small postnasal usually present; young lacking all trace of dorsolateral and lateral lines; scales, parietals to above anus, 61-63; palpebral and superciliaries separated throughout (or practically so) by a series of intercalated granules; primary temporal large; a brown lateral band; 24-26 scale rows; olive with blue tail in young; bronze or olive bronze in adult. (New Mexico, Texas and Western Mexico).....*Eumeces humilis* Boulenger, page 358

AA. Two postmentals normally; postnasal present or absent; anterior temporal variable; scales under tail more widened; median line present or absent; dorsolateral lines present; the lateral line present or absent; dorsal color variable; the palpebral scales always separated partially from superciliaries.

B. No distinct median line or traces of bifurcating lines on head in young or adults; postnasal present or absent; 24 scale rows; 16 scales around tail at base; snout to vent, 66 mm.; distinct dorsolateral and lateral lines, with a lateral brown stripe. (New Mexico and western Texas.)
Eumeces gaigei Taylor, page 353

BB. A rather dim, broad, secondary median line develops with age, or may be dimly evident in young; dorsolateral line strongly defined, narrow; primary lateral line to forearm or to hind leg; if not, a secondary line develops on side with age; ground color produces brown lines bordering the light lines and as a result secondary light lines (usually quite light in color) appear between the other darker lines; postnasal normally present (occasionally absent); scale rows, 24-26; max. size, 73 mm. (Nebraska and Wyoming south through Colorado and New Mexico).....*Eumeces multivirgatus* (Hallowell), page 341

Eumeces multivirgatus (Hallowell)

(Plates 27, 28; Figs. 54, 55, 56)

SYNONYMY

1857. *Plestiodon multivirgatum* Hallowell. Proc. Acad. Nat. Sci. Phila., 1857, p. 215 (type description; type locality "Posa creek, 460 miles west of Fort Riley, Kansas" [probably Cow creek, Larimer Co., Colo.]; Hammond Coll.); Garman, Bull. Essex Institute, XVI, Jan. 9, 1884, pp. 14-15 (placed with *Eumeces*); Stejneger and Barbour, Check List N. Amer. Amph. Rept., 1917, p. 70; Pratt, Vert. Anim. U. S., 1923, p. 207.

1858. *Plestiodon leptogrammus* Baird. Proc. Acad. Nat. Sci. Phila., 1858, p. 256 (type description; type locality Platte River Valley [Nebraska?] Lt. Warren, Dr. Hayden Colls.); Garman, Bull. Essex Inst., XVI, Jan. 9, 1884, pp. 14-15 (placed under *Eumeces*).

1858. *Plestiodon inornatus* Baird. Proc. Acad. Nat. Sci. Phila., 1858, p. 256 (type description; type locality Sand Hills of Platte river [Nebraska]; Lt. Warren and Dr. Hayden Colls.); Garman, Bull. Essex Inst., XVI, Jan. 9, 1884, pp. 14, 15 (placed under *Eumeces*).

1875. *Eumeces multivirgatus* Cope. Bull. U. S. Nat. Mus., No. 1, 1875, p. 45; Cragin, Kansas Acad. Sci., VII, 1879-'80 (1880), p. 120; Yarrow, Bull. U. S. Nat. Mus., No. 24, 1882, p. 4 (? Rio Pecos, Texas); Cragin, Kansas Acad. Sci., IX, 1883-'84 (1885), p. 138 (? Neosho Falls, Kansas); and Bull. Washburn Col. Lab., I, 1885, Mar.-Apr., No. 3, p. 102 (same data as in preceding paper); Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 365 (footnote); Cope, Ann. Rept. U. S. Nat. Mus., 1898 (1900), pp. 653-655, fig. 181; Brown, Proc. Acad. Nat. Sci. Phila., 1903, p. 553; Ellis and Henderson, Univ. Colorado Studies, X, No. 2, 1913, pp. 80, 81 (near Greeley, Colo.); ? Strecker, Baylor Bull., XVIII, No. 4, Aug., 1916, p. 26 (error regarding type of *Plestiodon inornatus* due to mechanical error in printing [Cope, 1900, p. 655], the bracket should not include the Texas spec. No. 3122); Ditmars, Rept. Book, 1915, p. 196; Stejneger and Barbour, Check List N. Amer. Amph. Rept., 2d Ed., 1923, p. 76; Van Denburgh, Proc. Cal. Acad. Sci., (4), XIII, No. 12, Mar. 18, 1924 (New Mexico records); Cockerell, Zoöl. Colorado, 1927, p. 106 (New Mexico records, not Colorado [part.]); Burt, Trans. Acad. Sci. St. Louis, XXVI, No. 1, Aug. 1928, pp. 56-58 (Kansas records given are questionable); Mosauer, Occ. Papers Mus. Zoöl. Univ. Michigan, No. 246, June 9, 1932 (part.); Stejneger and Barbour, Check List N. Amer. Amph. Rept., 3d Ed., 1933, p. 81.

1875. *Eumeces leptogrammus* Cope. Bull. U. S. Nat. Mus., No. 1, 1875, p. 45; Cragin, Kansas Acad. Sci., VII (1879-'80), 1880, p. 120; Yarrow, Bull. U. S. Nat. Mus., No. 24, 1882, p. 40 ("100 mi. east of Fort Laramie, Wyo."); Boulenger, Cat. Liz. British Mus., III, 1887, p. 378 (regards *epipleurotis* as being the adult of *leptogrammus*); Cope, Ann. Rept. U. S. Nat. Mus., 1898 (1900), p. 651, fig. 130; Ellis and Henderson, Univ. Colorado Studies, X, No. 2, 1913, pp. 80, 81; Strecker, Baylor Bull., XVIII, No. 4, 1916, p. 26; Ditmars, Reptile Book, 1915, pp. 197, 198.

1875. *Eumeces inornatus* Cope. Bull. U. S. Nat. Mus., No. 1, 1875, p. 45; Cragin, Kansas Acad. Sci., VII, (1879-'80), 1880, p. 120.

1880. *Eumeces epipleurotis* Cope. Bull. U. S. Nat. Mus., No. 17, 1880, pp. 40, 41 (type description; type locality "Northern Boundary of Texas," and "Nebraska at Ft. Kearney"); Cragin, Kansas Acad. Sci., VII (1879-'80), 1880, p. 120.

History. This species, one of the most distinctive of all that are found within the borders of the United States, considered on the basis of coloration and markings, was described as *Plestiodon multivirgatum* in 1857 by Hallowell, from a single specimen collected, presumably, in northeastern Colorado by Doctor Hammond, U. S. A., at Cow creek, "450 miles west of Fort Riley" (Kansas).

The following year Baird again described the species under two separate names, *Plestiodon leptogrammus* and *Plestiodon inornatus*, from material presumably collected in western Nebraska by Lieutenant Warren and Dr. F. V. Hayden, the type locality being "Platte River Valley" for *leptogrammus*, and for *inornatus* "Sand Hills of Platte." These were separated on the basis of a variation in the character of the postnasals, and on color differences. It would appear that Baird was unaware of the previous description by Hallowell of *multivirgatus*.

In 1880 Cope again described the form under the name *Eumeces epipleurotis* from the "northern boundary of Texas" and from "Nebraska at Fort Kearney." Later the second specimen was listed under *multivirgatus* (Cope, 1900).

Boulenger (1887) makes *epipleurotis* a synonym of *leptogrammus* but fails to allocate *inornatus* and *multivirgatus*, and merely lists them in a footnote (p. 365) without further comment. Cope (1900) failed to agree with Boulenger's disposition of the forms and maintained three of them as distinct, but placed *inornatus* as a synonym of *multivirgatus*.

The four-lined pattern (with a dim secondary median line and a suggestion of secondary bifurcating lines on the head), is usually largely obscured by the secondary pattern of dark and light lines. The brown pigment of the ground color forms a series of dark lines leaving a ground color of secondary light lines. It seems to present something of the 'desert coloration' of many mammals and reptiles. Unfortunately I have not examined any live or freshly preserved young material and am not aware whether the tail of the young is

blue or not; the young in the preserved material examined have tails with only a suggestion of blue, but they are probably dark blue in life.

The types of *inornatus* (No. 3110, U. S. Nat. Mus., 2 specimens) are puzzling. They are in excellent condition and still have the chief color characteristics described by Cope (1900). The type description does not mention color, but the name suggests the lack of markings. These specimens are pea green (Ridgeway's), uniformly colored over the dorsal surface of head and body to the tail (the regenerated tail approaching buff), while the ventral surface is generally a much lighter shade of pea green, the chin and throat cream. There are no lines or markings discernible save a doubtful suggestion of the dorsolateral light line. As these specimens are of medium size, both 53 millimeters from snout to vent, the loss of markings cannot be construed as a change brought about by old age. The measurements, given elsewhere, show no variations from the typical.

The types of *Eumeces epipleurotis* are in the U. S. National Museum (Nos. 9219, Fort Kearney, Nebraska, one specimen [formerly two?], and 5263, Northern Boundary of Texas). The second of these two specimens is in a very bad state, lacking all trace of color pattern, and cannot be identified with certainty. The other specimen, 9219, is in good condition. This specimen I designate as the lectotype of *Eumeces epipleurotis*, since it appears to be the specimen from which the type description was drawn. (Cope, 1900, p. 651, was under the wrong impression—that No. 5263 was in existence.) This lectotype is a very typical specimen of *Eumeces multivirgatus*. The other specimen cannot be certainly identified, but quite probably it is a specimen of *multivirgatus*.

The types of *Eumeces leptogrammus* apparently are lost; at least they are no longer to be found in the National Museum collections so designated. Cope (1900) lists the type number given by Baird (No. 3119) with the following notation: "10 specimens, Running Water, Nebraska, Lieut. Warren," but does not designate them as the types. Judging by the type descriptions and that given by Cope (1900), *leptogrammus* is an absolute synonym of *multivirgatus*.

The type of *multivirgatus* is No. 9371, Academy Natural Sciences of Philadelphia. It is in excellent condition, save that a few scales are missing on the sides and abdomen. Hallowell stated that the type locality was Posa creek, 460 miles west of Fort Riley, Kan.

Fortunately, the original tag is present and reads "Cow creek." The "Posa" is either a typographical error or an error of Hallowell in reading the label. It most probably refers to Cow creek, Larimer Co., Colorado, which is roughly this distance, though somewhat north of direct west.

It seems certain that *leptogrammus* and *epipleurotis* should be thrown into synonymy. I am less certain in regard to *inornatus*, since the total absence of the elaborate color pattern (provided it has not been brought about by preservation) suggests change in the species that, were it a prevalent condition, should receive nomenclatorial recognition. In June, 1932, I made a journey into Nebraska to study *multivirgatus* in the field, hoping that new collections might throw some light on the matter. Five days spent in intensive search resulted in my finding not a single individual, although a large variety of possible habitats were examined, and this in more than thirty localities between Ogallala and Scott City, Neb. In this work I am reluctantly placing *inornatus* in the synonymy of *multivirgatus*.

Diagnosis. A dim secondary median line extending length of body, apparently bifurcating on the interparietal; the dorsolateral light lines distinct; the laterals present to arm; additional secondary dark and light lines formed by ground color also present, growing more distinct with age.

A variable postnasal (occasionally absent or greatly reduced), small or large, separating, or not, the anterior loreal from the labials; normally two postmentals (rarely one); 24-26 scale rows around body and 61-65 scales in row from occiput to above anus; generally light gray to grayish-white above with, usually, ten brown longitudinal lines of unequal width, several extending to near tip of tail.

Description of species (drawn largely from specimens from northeastern Colorado). Portion of the rostral visible from above somewhat less than extent of the frontonasal, from which it is separated by the length of the supranasal suture; supranasals not greatly longer than wide, in contact or not with the postnasal; frontonasal broader than long, usually separated from the frontal, touching the anterior loreal laterally; prefrontals pentagonal, the inner sides usually smallest (quadrangular when frontonasal and frontal are in contact); frontal much wider anteriorly than posteriorly, slightly constricted at a point about one fourth of its length from the posterior end, and in contact with three supraoculars (the third rarely

excluded); frontoparietals moderate, forming a median suture one third of their length; parietals moderate, not enclosing the interparietal; latter, small, not greatly attenuated; normally two nuchals, the anterior widest, but posterior pair may be broken up into four scales almost identical with the dorsal neck scales; nasal small, divided, the anterior part larger than posterior but not greatly wider; the nostril is pierced entirely posterior to the suture of first labial and rostral, and is directed downward and forward; postnasal variable, from size of pin point to a scale as large as the reduced upper loreal, and may or may not separate the anterior

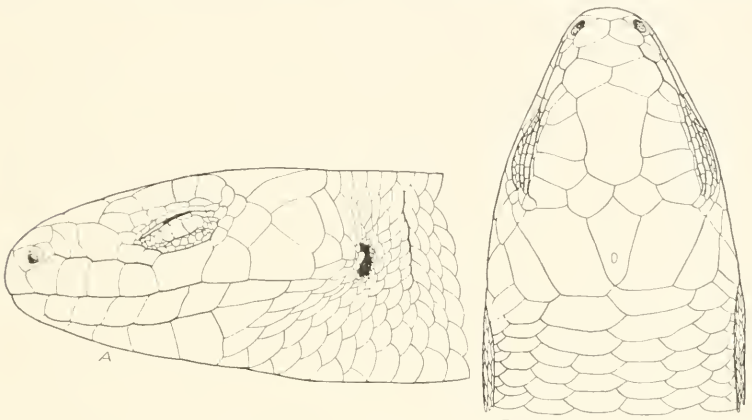

Fig. 54. *Eumeces multivirgatus* (Hallowell). E.H.T. Coll.; Weld Co., Colorado; Barry, collector. A, lateral view of head; B, dorsal view of head. Actual head length, about 9 mm.; width, about 8 mm.

loreal from the labials, occasionally in contact with the supranasals, rarely absent; posterior loreal large, not reaching as high as anterior, its shortest side forming a suture with the prefrontal; four supraoculars, the first and last of nearly equal area, the three anterior touching the frontal; the superciliaries vary from five to seven, the usual number being six; three or four median palpebral scales form direct sutures with the superciliaries; others separated by a series of small granules; two or three (usually three) enlarged opaque plates on lower eyelid, separated from subocular by two rows of granules; two presuboculars and four or five postsuboculars; seven upper labials, the last largest, the fifth and sixth not differing greatly in area; of the anterior four, the fourth is smallest, and the first or third largest; one or two anterior labials touch the postnasal; one, two or none touches the first loreal; and numbers two and

three touch the second loreal; last labial followed by a postlabial, which is separated from ear by one or two small preauricular scales; edge of ear with one or two small lobules; the primary temporal small, generally rectangular; upper secondary much the largest, much elongated; lower secondary somewhat fan-shaped, touching the primary temporal, separating seventh labial from the upper secondary temporal; the tertiary temporal is small, usually not strongly differentiated from the neck scales, separated from ear by one or two scales; mental with a much wider labial border than the rostral; two postmentals; normally six lower labials; chinshields typical, varying somewhat in relative length and width, the third pair followed by an elongate scale bordering lower labials, and another scale bordering the former, of same shape but very much smaller.

Ear opening moderately small, 17 to 19 scales surrounding the opening; the line separating postauricular series from the lateral neck scales nearly vertical; that separating the lateral neck scales from the suprabrachials is slightly anterior to and above insertion of forearm; the scales on side of body parallel save in the suprabrachial and the axillary region, where they are strongly diagonal. Scales about neck behind ear, 30-33; on neck, 27-30; behind arm, 31-33; about middle of body, 24-26; about base of tail (postanal), 19-20; in a row from occiput to above anus, 61-63; one or more of the intercalated axillary scale rows may continue a distance greater than the length of forearm, behind the axilla; the scales of the dorsal median rows somewhat larger than the adjacent scales; subcaudal scales, 93-95, distinctly widened; median preanal scales largest, overlapped by the adjoining scales, which are in turn overlapped by the much smaller outermost pair.

Limbs small, relatively weak, overlapping when adpressed in small, young specimens, but separated the length of hand (or more) in older and adult specimens; 12 scales about insertion of hind limb; lamellar formula for fingers: 5; 8; 13; 10; 6; for toes: 6; 9; 11; 13; 9; no enlarged tubercular scales on sole save on border of heel; those about base of fourth toe enlarged and flattened.

Color and markings. Above generally a putty-colored gray of varying shades, with series of dark-brown lines; the dorsolateral lines are distinctly lighter, the median less so, and the lateral scarcely can be differentiated from the light lines of the ground color; the median line broad, covering two half rows of scales, growing less distinct on the occiput, forking and running forward

to rostral as dim shadowy light lines on the olive-brown of the head; this bordered laterally by two deep brown lines which cover the outer half of the median row and inner third of the second; outer two thirds of the second row light ground color, forming a distinct stripe; inner fourth of the third row brown, forming a brown line of more or less continuous, small, triangular spots; the median half of the third row traversed by the dorsolateral light line, which arises on the posterior superciliaries and continues to the tail; outer fourth of the third row brown, forming a line of brown triangular spots more or less continuous; inner half of fourth row light ground color, outer half of the same dark brown, extending over onto the fifth row; this bordered by another light line which is the little-differentiated lateral light line which appears to begin near or on the rostral; below this the color becomes the more or less uniform greenish-white to cream color of the entire under surface; the chin, underside of the arms, preanal region, and a stripe under the tail can be discerned as lighter; the tail above is somewhat lighter than the ground color of the body and the dark and light stripes of the body can be followed sometimes to the tip of the tail.

Variation. As has been already suggested, the postnasal may be entirely wanting; 5 specimens, three from Gehenes Mt., N. M.;

Measurements of *Eumeces multivirgatus* (Hallowell)

Museum Number*	D.M. 8	D.M. 6	D.M. 7	D.M. 5	D.M. 2	D.M. 3	D.M. 4	D.M. 1	U.S.N.M. 3110	U.S.N.M. 3110
Snout to vent	63	62	62.5	60	58	57	56	55	53	53
Tail	.....	.....	.....	106	95	94	.....	91	.....	.....
Snout to foreleg	19	19	18.5	19.5	17.8	19	18.2	16.5	16.2	16
Snout to ear	10	10.5	10	10.1	9.7	9.6	9.5	9	9.2	9
Snout to eye	4.3	4.2	4.2	4.3	4	4	4.2	3.3	3.2	3.4
Axilla to groin	37	35	36.5	36	33.5	33	33	34	30	30
Width of head	9	9	9	9	8	8	8	8	7.8	7
Length of head	9	9.3	9	9	9.2	9	9	9	8.2	8
Postanal tail width	7	6	7	6.5	6	5.8	5.2	6	6	6.2
Foreleg	14	13.5	14	15	13.5	13.2	12.2	13.5	12	13
Hind leg	18	18.5	18	18	16	17.5	15	16.2	16	15
Adpressed limbs separated	6	6	5	8	5	7	5	10	.....	.....
Longest toe	.....	5.2	6.6	5.5	5.3	5.5	5	5.2	.....	.....

* Museum of Natural History, Denver, Colo.; Nos. 1-6 and 8 are from Milton reservoir, Weld Co., Colo.; No. 7 from Roggin, Weld Co.; No. 3110 U.S.N.M. types of *inornatus*.

one from the Guadalupe Mountains, Texas, and one from Greeley, Colorado, show this condition on both sides, while several Nebraska specimens show the scale absent on one side or the other; specimens having a large postnasal in contact with a second loreal and the supranasal occur in the same locality as those with very small ones, in contact with neither scale. The number of postmentals is very constantly two; in 43 specimens examined three only show a single large undivided postmental. Two of these are from Nebraska (Sioux Co., and Sand Hills of the Platte river); one is from Pecos, San Miguel, N. Mex. The lamellae under the fourth toe vary from 11 to 15; the highest numbers, 14 and 15, are from the southern part of the range in New Mexico, while the numbers 12 and 13 are most common in the northern part of the range. The number of upper and lower labials is seven and six, respectively. A single specimen, Weld Co., Colo., has six upper labials, the third and fourth being completely fused, while a single specimen from near Walsenberg, Colo., has eight upper labials on one side, seven on the other; twelve specimens from several widely separated localities have the frontonasal touching the frontal.

The temporals show but little variation, but the character of the preauricular scales and the postlabials varies considerably. Usually there are four of these scales, but sometimes there are but two, three, or very rarely one enlarged scute.

I am unable to distinguish the sexes by color alone. The lateral postanal scute is but slightly differentiated on the males.

The species does not attain a very large size. The maximum size seen is, snout to vent measurement, 73 mm. (tail partly regenerated)—that of a specimen from Estancia, N. M., collected by Hobart Smith. Specimens next in size are 64 mm., one from Sioux county, Nebraska, one from southern and one from northeastern Colorado.

Eight specimens, ranging in length from 40-60 mm., having complete tails, show the average relation of tail length to total length to be approximately .68; of the snout to forearm length, in body length, .32; foreleg to body length, .23; hind leg to body length, .30; axilla to groin distance in body length, .59. In very young specimens these proportions vary considerably from those of the adult; the tail is .56 percent total length; snout to foreleg in body length, .32; foreleg to body length, .27; hind leg to body length, .34. Thus it appears obvious that the limbs are proportionally longer in the young than in the adult. In the young the legs overlap or touch when adpressed.

The following are characters of the two types of *inornatus*, U.S. N.M. 3110 ♀ ; 3110 ♂ . Scale rows, 25-25; postsuboculars, 4-4, 4-4; nuchals, 2-3, 2-2; lamellae under 4th toe, 13-13, 13-14; preanals, 6-6, median enlarged; loreal divided, with 1-0 postnasals, loreal divided, no postnasals present (measurements given in the table).

The markings on very young (U.S.N.M., No. 3180, 12 specimens from 100 miles east of Laramie, in Nebraska, classified by Cope as *leptogrammus*) are as follows: In these the typical lines are extremely dim, instead of being strongly pronounced as in the young of most species that are striped. The median line appears as a very dim series of transversely widened light areas on the posterior edges of the median scale rows, and no more distinct than a similar series on the second scale row; the median line at the nuchal gives off two very dim branches which go forward to the interparietals, where they stop—then again begin on the sides of the frontal, gradually growing more definite, and forming a widened spot on the outer edge of the prefrontal and continuing forward to the rostral. There is no such intensity of light color as obtains in the dorsolateral or lateral lines.

The dorsolateral line is, however, relatively distinct; arising on the first superciliary it continues back distinctly, showing on the head, becoming less distinct on the neck, but continuing to the tail as a series of transversely widened whitish dots along the third scale row; the labial region is white and the line, very distinct, passes through ear and continues well-defined to foreleg, and on the side of the body is represented by dim light dots on the lateral scales. The tail was probably bluish in life.

The specimens are somewhat discolored by alcohol, but, while the original colors are in doubt, the markings presumably remain as in life. Specimens preserved in formalin lose their coloration and the marking can scarcely be discerned.

Remarks. Mr. Lewis V. Barry of the Denver Museum has found the species to be common and easily collected in Weld county and in Denver county, occurring in vacant lots in Denver City. He has furnished me with numerous splendidly preserved specimens, and numerous notes. He states:

"May 13, 1931, on a trip for rattlesnakes near Milton reservoir in Weld county, we found the first skink. Later the same day four more were collected. These were all found under cow dung in a prairie-dog town, feeding on ant larvae.

"Another specimen was taken near Grover in Weld county by Donald Watson, who was collecting birds in the region. He shot a Desert Sparrow Hawk, and the bird had one of these reptiles in his claws."

The species is oviparous; an American Museum specimen (A.M. N.H. 32382, Sioux Co., Neb.) has five white eggs, measuring approximately 13 x 8 millimeters, greatest length and width.

Distribution. The present known distribution of *Eumeces multivirgatus* includes western South Dakota, western Nebraska, eastern Wyoming, eastern Colorado, northwestern Texas, northern New Mexico, and northern Arizona. It has, apparently, not yet been taken in Oklahoma or Kansas. The eastern Kansas records (Burt, 1928) must be considered as extremely doubtful. Burt, quoting Stejneger in letter, Sept. 9, 1926, states:

"In 1915 and 1916 Mr. V. H. Householder sent me some Kansas skinks for identification. One from Labette Co., I identified as *E. epipleurotis*, which I now consider identical with *E. multivirgatus*. Another from Anderson county I identified as *E. leptogrammus*. This I also consider a synonym of *E. multivirgatus*."

Cragin (1881) lists a specimen from Neosho Falls, Woodson county. None of the specimens are present in the collections of Kansas University or Washburn College, where one presumes they would be. Were they correctly identified one might presume they were from other localities. It is quite likely that the form will eventually be found in western Oklahoma and western Kansas. Unless the Kansas specimens, so identified, can be resurrected and

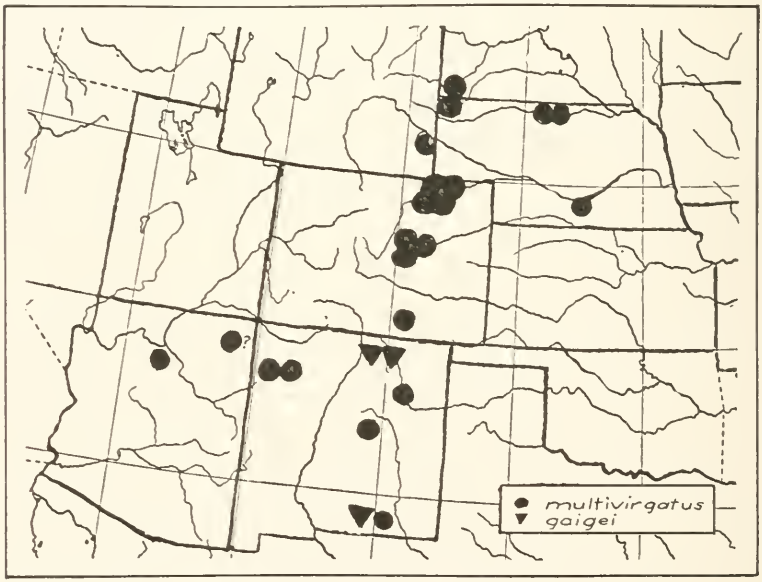

FIG. 55. Distribution of *Eumeces multivirgatus* (Hallowell) and *Eumeces gaigei* Taylor, in Southwestern United States.

their localities verified beyond reasonable doubt, it seems wisest to disregard them.

Locality records:

NEBRASKA:

Sioux Co.: (A.M.N.H. 1).

Brown Co.: Long Pine (U.S.N.M. 2).

Kearney Co.: Fort Kearney (U.S.N.M. 1; holotype *epipleurotus*).

Indeterminate localities: Sand hills of Platte (U.S.N.M. 7); 100 miles east of Fort Laramie, Wyo. in Nebraska (U.S.N.M. 11); Nebraska (A.M.N.H. 2); Pole Creek, Neb. (Cope, 1900); Running Water river (Cope, 1900).

SOUTH DAKOTA: Only record SW Dakota (M.C.Z. 2, Garman Coll.).

WYOMING:

Goshen Co.: Laramie (M.C.Z. 1, Bierstadt Coll.).

Unidentified locality: Bridger's Pass (U.S.N.M. 1, W. S. Wood Coll. [perhaps Uinta Co.]).

COLORADO:

Huerfano Co.: South of Walsenburg (Mich. U. 1).

Denver Co.: 26th and Ivanhoe streets, Denver city (Priv. Coll. David Garrett and Bob DeCamp 5); Municipal Airport (E. H. Taylor 7, David Garrett Coll.).

Weld Co.: Milton Reservoir (Colo. Mus. Denver 1); Greeley (U.S.N.M. 1); near Greeley (State Teach. Coll. Mus. Colo. 1); Big Bend (State Teach. Coll. Mus. Colo. 1).

Indeterminate: Cow creek (not Posa), 460 miles west of Fort Riley (Kansas) (probably Cow creek, Larimer Co.) (A.N.S.P. 1; type *multivirgatus*, Hammond Coll.).

NEW MEXICO:

San Miguel Co.: Pecos (Mich. U. 1).

Torrance Co.: Estancia (E. H. Taylor 1, H. Smith Coll.).

McKinley Co.: Fort Wingate (U.S.N.M. 2).

?*Eddy Co.:* Guadalupe Mts. (Mich. 1).

Unidentified localities: Gehenes Mt. (A.M.N.H. 1, B.T.B. Hyde Coll.); New Mexico, a short distance from the Texas line (Strecker, 1916); New Mexico (U.S.N.M. 1, Hurter Coll.).

ARIZONA: A single specimen, U.S.N.M. 11459, Cave Springs, Apache Co., Arizona, Henshaw Coll., is in such bad state that it cannot be certainly identified.

Coconino Co.: Near Elder Mt. (Klauber 1).

?KANSAS, doubtful records:

Woodson Co.: (Cragin, 1881).

Labette Co.: (Burt, 1928).

Anderson Co.: (Burt, 1928).

TEXAS: Two records, northern boundary of Texas, one of the types of *epipleurotus* (U.S.N.M. 1); and Rio Pecos, Texas, a specimen formerly in the U. S. National Museum (No. 3122) but now lost, constitute the only records for Texas. The type itself is in such a state that it cannot certainly be identified.

ADDENDA

Since the above was written I have examined a series of specimens from Arizona. First, I received a very young specimen from Mr. Edwin D. McGee, park naturalist for the Grand Cañon National Park, in which locality the specimen was collected. This specimen shows three well-developed light dorsal lines (a dorsolateral line and a median which bifurcates on the nuchal, the branches reuniting on the rostral). The lateral line is quite distinct on the labials and is continued as far as the foreleg, after which it narrows and continues as a scarcely discernible line as far as the hind leg. The tail is blue. There are no secondary lines evident.

Some time later five other specimens were sent me: One from L. M. Klauber, collected in Arizona; and four sent by Chas. M. Bogert, collected near Mt. Elden, 7½ miles east of Flagstaff, Ariz. Three of these are in a poor state of preservation; the fourth, however, is well-preserved, showing the color and markings fairly well. It agrees with the younger specimen save that, being older, two secondary light lines have developed between the median and the two dorsolateral lines; and two secondary lines have likewise developed on each side in the lateral region between the dorsolateral and lateral lines. The same characters are dimly evident in the three much larger specimens which apparently were originally preserved in formalin. This color pattern shows a much closer relationship to that of *multivirgatus* than I had believed possible when examining the young specimen. These specimens differ from the typical *multivirgatus* in having usually a distinctly smaller frontonasal, somewhat larger nasals and prefrontals; a smaller interparietal enclosed (or nearly so) in the five specimens. The frontoparietals are distinctly larger.

The color of the one specimen (No. 200, Bogert Coll.) shows the median line interrupted a short distance back of the nuchals; the median line and dorsolateral are bordered by deep black lines instead of the brown lines, and the median line is narrower.

In the United States National Museum there are two problematical specimens, both old and much faded. One (U.S.N.M. No. 30833) shows the primary light lines dimly, but shows no trace of the secondary pattern of dark and light lines; the lines on the head are obsolete. The frontoparietals are abnormal, one being completely fused with the frontal or parietal, and the other one is much smaller than a prefrontal. The postnasal is lacking. There are two postmentals, the second (perhaps abnormally) separated from the labials. (See Fig. 56.)

The second specimen, U.S.N.M. No. 25437 (Ruidoso creek, Lincoln Co., N. Mex.), likewise has the secondary pattern wanting, but this may be due to fading. It agrees more closely with *multivirgatus* than the other specimen.

At first I regarded these specimens as worthy of a nomenclatorial designation; but with the added material from Arizona, I recognize the wisdom of awaiting more material from this critical region before such a step is taken.

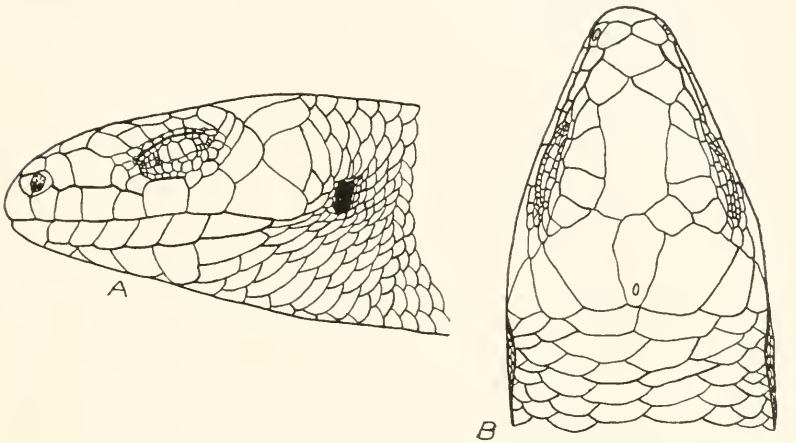

Fig. 56. *Eumeces multivirgatus* (Hallowell). U.S.N.M. No. 30833, Chihuahua, Mexico. A, lateral view of head; B, dorsal view of head. Actual head length, 10.2 mm.; width, 9.5 mm.

The following locality records are added:

Arizona: *Coconino Co.:* Grand Cañon Nat. Park (Grand Cañon Nat. Park Coll. 1); Flagstaff (Bogert Coll. 1); Mt. Elden, 7½ mi. east of Flagstaff (Bogert Coll. 3) (L. M. Klauber 1).

New Mexico: *Lincoln Co.:* Forks of the Ruidoso creek (U.S.N.M. 1).

Chihuahua: Chihuahua (U.S.N.M. 1).

Eumeces gaigei Taylor

(Figs. 57, 55)

SYNONYMY

1932. *Eumeces humilis?* Kingman. Bull. Univ. Kan., XXXIII, May, 1932 (Oct. 1, 1932), pp. 273-293, pl. XXIII, figs. 1 and 2 (Skull, paratype of *gaigei*).

1935. *Eumeces gaigei* Taylor. Uni. Kan. Sci. Bull., Vol. XXII, Apr. 15, 1935, pp. 219-223, fig. 1.

Diagnosis. A medium-sized species, characterized by the absence of a median line with forking lines on the head; the presence of typical dorsolateral lines following the middle of the third scale row, and separated by four whole and two one third scale rows.

The lateral line extends back farther than ear. Brown lateral stripe very narrow; limbs short, not meeting when adpressed; subcaudals widened; postnasal present or absent; two postmentals; interparietal not enclosed by parietals; seven upper labials; 24 scale rows about the body.

Description of type. No. 7300; collected near Taos, N. Mex., June 13, 1929, by E. H. Taylor. Portion of rostral visible above less than half the size of the frontonasal; supranasals large, forming a median suture; frontonasal large, touching anterior loreals, separated from frontal; prefrontals rather large, medially in contact,

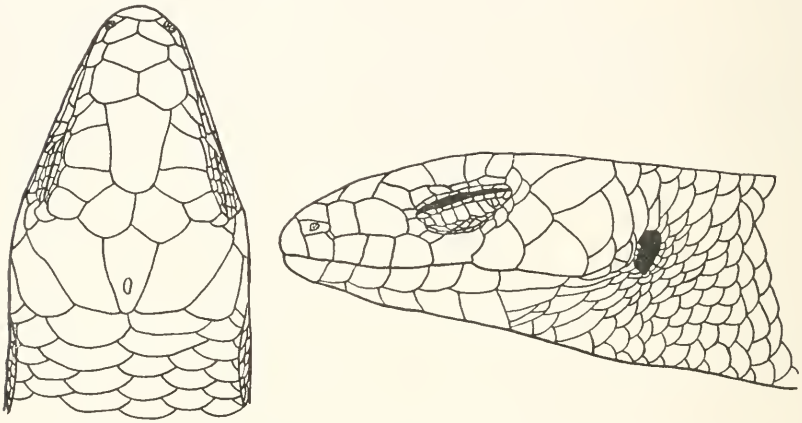

FIG. 57. *Eumeces gaigei* Taylor. Mich. U. No. 70517, Culberson Co., Texas. A, lateral view of head; B, dorsal view of head. Actual head length, 9.2 mm.; width, 7.8 mm.

forming sutures with frontonasal, frontal, posterior loreal, first supraocular, anterior loreal, and superciliary, their lengths in the order named; frontal large, a little longer than its distance from the tip of the snout, slightly constricted laterally, in contact with three supraoculars; frontoparietals in contact; interparietal with sides converging posteriorly, not curving; parietals short and broad, not in contact behind interparietal; two pairs of nuchals, of about the same size.

Nasal typical, divided by a suture, the anterior part largest; postnasal present; anterior loreal distinctly higher than wide, higher than the posterior; latter longer than high, touching two or three labials; presuboculars two (one on right side); six (right) or seven (left) superciliaries; four supraoculars; four postsuboculars; median upper palpebrals directly in contact with superciliaries; two rather

large plates on lower eyelid, separated from subocular by two rows of granules; primary temporal large, practically of same size as the lower secondary temporal, with which it forms a suture; upper secondary temporal slightly wider posteriorly than anteriorly; tertiary temporal high, slender, separated from ear by two scales.

Seven upper labials, the first usually the smallest, the seventh (last) largest; the subocular larger than usual, approaching or equaling size of sixth labial; seventh labial separated from ear by two pairs (superimposed) of scales; one minute ear lobule; mental large, with a larger labial border than rostral; two postmentals; three pairs of chinshields, the first in contact; postgenial large (broken abnormally into two scales), bordered on inner side by a scale longer than wide; six or seven lower labials.

Scales in parallel rows, about equal in size around the body; scales around neck behind ear, 32; about narrow part of neck, 26; in axillary region, 32; about middle of body, 24; 16 about base of tail at first widened subcaudal; subcaudals nearly double width of adjoining scale row; six preanals, the median pair much enlarged, the outer scales overlapping inner.

Limbs short; the area of granular axillary scales greatly reduced, only one or two rows; none behind insertion of hind limb; wrist tubercle not strongly differentiated; the scales on wrist and posterior part of palm equal in size, all rather large; lamellar formula for fingers: 5; 8; 10; 11; 6. Heel with two large scales in contact, these each preceded by a single large scale; scales on sole subequal and for the most part imbricating; lamellar formula for toes: 5; 9; 11; 12; 8. Terminal scales not tightly bound about claw. Ear small, surrounded by about 16 scales; scales on side of neck with, usually, two pits; these obsolete on sides of body; pits occasionally three or more in axillary and postfemoral region.

Color (the type is somewhat discolored by formalin). Above brownish, the scales showing an anterior and a posterior darker area; no evidence of a median line or bifurcating lines on head; a dorsolateral line begins on the anterior supraocular and continues back, following the middle of the third scale row, as a series of light dots onto the tail. The lateral line begins on the rostral but cannot now be traced quite to ear; chin, anterior part of throat and anal scales light; underside of regenerated tail, light.

Remarks. The two type specimens from near Taos, N. Mex., in the Kansas University Museum were collected in barren hills along a stream about a mile from the large Indian village through which

Measurements of *Eumeces gaigei* Taylor

Museum Number Sex	K.U. 7300 ♀	K.U. 7301 ♀	Mich. 70517 ♀
Snout to vent	66	62.7	59
Snout to eye	5	5	4
Snout to ear	11.8	11	10
Snout to foreleg	22	18	16
Axilla to groin	40	39.4	35.5
Width of head	8.7	8.2	7.8
Length of head	10	10	9.2
Width of body	12	11.9	10
Foreleg	14	13.8	13
Hind leg	19	18.7	18
Longest toe	12	12	11

the stream flows. They were found under small, flat rocks on a steep hillside, and appeared to be making burrows, as the earth was freshly disturbed; they took refuge in the burrows, which extended three inches below the surface.

I made journeys to Taos in 1930 and 1934, hoping to discover more specimens, but without result.

The Michigan specimen, which I have been permitted to examine through the kindness of Mrs. Gaige, was collected in the Guadalupe Mountains by Dr. Walter Mosauer, for whom I examined the specimen. I at first believed it to be an aberrant, discolored *multivirgatus*.

A fourth specimen, badly dried but still showing well the original coloration, is in the American Museum of Natural History. Through the kindness of Dr. G. K. Noble, I was permitted to examine it. The color characters are practically identical with those of the Michigan specimen, and differs strikingly from young *multivirgatus* from the same locality.

Variation. The specimen in the University of Michigan Museum shows the color markings very distinctly. These are as follows:

Above, olive-brown, the outer edges of the scales of the first and second rows with darker brown coloration, which forms a dim line following edges of first and second row, and second and third; the dorsolateral white line begins on supraocular or anterior edge of parietal, passes back along the middle of the third scale row, the upper and outer edges of which are dark brown; the light line ap-

pears as a series of dots, since the posterior edge of each scale is also somewhat darker; a broad, dark-brown line begins behind eye, passes above shoulder and becomes reduced to a narrow lateral line which passes above edges of the fourth and fifth scale rows; this is bordered above and below by dotted lines of ground color, slightly lighter than that on back; a light labial line from second labial passes above ear and stops; a lateral line begins at middle of ear and passes back to above arm and becomes lost; chin and throat light; belly bluish-gray; undersides of legs and anal region light; anterior part of head dark brown, no bifurcating lines visible.

The young specimen in the American Museum, also from the Guadalupe Mountains, has the brown ground color with the dotted dorsolateral lines cream yellow; along the median part of the body are a few lighter flecks on the scales, but in no sense a median line. This specimen differs from a young *multivirgatus* taken in the same locality.

The scale variation in these specimens is negligible save that in the Michigan specimen a typical postnasal is absent. On one side, however, is a small scale partially fused to (or separated from) the upper posterior part of the first labial.

Remarks. Despite the scale relationship of this form with *E. multivirgatus*, I do not regard it as a subspecies, since the two forms occur together from northern New Mexico (Taos) to Texas (Guadalupe Mountains). Much herpetological collecting remains to be done in New Mexico and Arizona before a clear picture of these forms and their relationship can be known.

Whether the specimen in the United States National Museum (No. 5263), from the northern boundary of Texas, one of the types of *epipleurotis*, belongs to this form cannot now be stated, since the specimen is in such a condition that it cannot be identified with any degree of certainty. I propose to designate U.S.N.M. No. 9219, Fort Kearney, Neb., as the lectotype of *epipleurotis*, since it appears that the description was drawn from this specimen. It is undoubtedly a specimen of *E. multivirgatus* and is still in a good state of preservation.

The species is named for Mrs. Helen Gaige, curator of Herpetology, University of Michigan, Museum of Zoölogy, to whom I am deeply indebted for assistance.

Distribution. The species is known only from the states of New Mexico and Texas, and from the following localities (see Fig. 55 for distributional map):

NEW MEXICO:
Taos Co.: Near Taos (K.U. 2; types).
Eddy Co.: Guadalupe Mountains (A.M.N.H. 1).
TEXAS: *Culberson Co.?:* Near Frijoles (Mich. 1).

Eumeces humilis Boulenger

(Plate 30; Figs. 58, 59)

SYNONYMY

1885. *Eumeces Bocourtii* Boulenger. Ann. & Mag. Nat. Hist., (5), 11, 1883, p. 342 (non Brocchi) (type description; type locality, Presidio (near Mazatlán, Sinaloa), (Forrer Coll.); Günther, Biol. Cent. Amer., Rept. Batr., 1885, p. 32, pl. XXII, fig. C (full-size drawing of one of the types); Cope, Bull. U. S. Nat. Mus., No. 32, p. 90.
1887. *Eumeces humilis* Boulenger. Cat. Liz. Brit. Mus., III, 1887, p. 377 (new name; redescription of types); Mosauer, Occ. Papers Mus. Zoöl. Univ. Michigan, No. 246, June 3, 1932, pp. 10-12, pl. I, fig. 3 (Guadalupe Mts., Texas; first record for United States).

History. Herr Alphonso Forrer collected the two type specimens of this rare species at Presidio, Mexico. This locality is presumably a small village about fifty miles south of Mazatlán (Kellogg, Bull. U.S.N.M. 160, p. 13), where Forrer collected many specimens. It may merely refer to a fort or prison of Mazatlán. In the state of Durango, however, where Forrer also collected, are three villages bearing the name Presidio, but whether any of these are referred to, cannot be ascertained at present.

The specimens were described by G. A. Boulenger in 1883 under the name *Eumeces Bocourtii.* Günther (1885) gave a figure, life size, showing the markings. Boulenger (1887) again published a description, changing the name to *humilis, bocourtii* being preoccupied by *Eumeces bocourtii* Brocchi for a New Caledonian skink.

No further specimens were obtained until 1930, when Walter Mosauer discovered it in the Texan part of the Guadalupe mountains, and collected two specimens, an adult female and a very young one, thus adding a new form to the known fauna of the United States. In 1931 I was fortunate in obtaining a single young specimen at a point two miles south of the entrance of Carlsbad Cavern in New Mexico.

This species differs from other known species of American skinks of this genus in lacking all white stripes or dots in the young. The adults may develop an indistinct secondary dorsolateral lighter line (much as occurs in some *obsoletus*) if one may judge by a photograph of the cotypes and Günther's figure of the older specimen. The latter has a "faint yellowish" dorsolateral line, while the younger specimen has no trace of white or yellowish lines. The lateral brown stripe is distinct in young and adults. The specimens

obtained by Mosauer, and that collected by me, likewise show no trace of dorsolateral or lateral light lines, but the lateral brown stripe is distinct. If the above assumption regarding the secondary development of a light dorsolateral line is incorrect it is due to the fact that in reality two forms are represented by the two type specimens, a question that cannot at the moment be determined due to the dearth of specimens available for study.

Diagnosis. A moderate-sized species reaching a known maximum length of 73 millimeters snout to vent measurement; young generally gray-olive above, lacking trace of light lines; a lateral brown

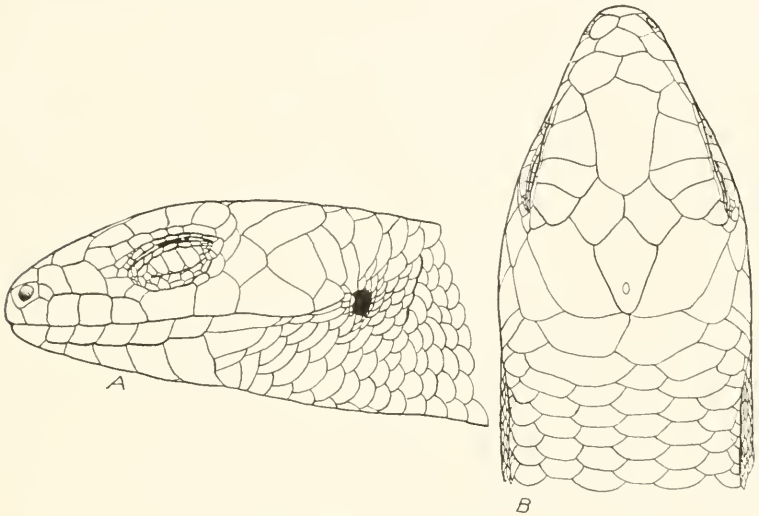

FIG. 58. *Eumeces humilis* Boulenger. K.U. No. 13161; Eddy Co., New Mexico. A, lateral view of head; B, dorsal view of head. Actual head length, 7.5 mm.; width, 6.0 mm.

band. Adults with or without trace of a faint dorsolateral line, with a darker, usually bronze, dorsal coloration. Upper labials seven; postmental single; small postnasal usually present; scales under tail small; limbs short; interparietal not enclosed by parietals; 24 scale rows about the middle of the body.

Description of species (from No. 70516 Museum of Zoölogy, University of Michigan. Collected Guadalupe Mts., Texas, by Dr. Walter Mosauer). Rostral prominently visible above; supranasals elongate, forming a narrow suture with postnasal, their common suture rather narrow; frontonasal broader than long, touching both loreals, but separated from the frontal by the prefrontals, which form a moderately wide median suture; frontal (3.5 millimeters) distinctly longer than its distance from the end of snout, bordered

by three supraoculars, the suture with last being very small; frontoparietals larger than prefrontals, forming a broad median suture; interparietal (2.5 millimeters) much shorter than frontal, not enclosed by parietals, but their separation is narrow; two well-differentiated pairs of nuchals; the nasal with its labial suture less than that with rostral; a small postnasal present, touching first two labials; anterior loreal much higher than and about half the width of second, which touches the second and third labials; two rather large presuboculars, with a small preocular scale above at anterior corner of eye; seven superciliaries, the anterior greatly larger than second; two tiny postoculars; three postsuboculars, the upper largest, touching the upper secondary temporal; four supraoculars, the second much the largest and widest; a large, well-developed, nearly rectangular primary temporal; two secondary temporals, the upper twice as long as wide, rounded behind, the lower nearly triangular, the posterior border, however, forming a very obtuse angle, touching the primary temporal; tertiary temporal small, narrow; two postlabials, the lower much smaller than upper, these separated from the auricular opening by a pair of very small, similarly shaped scales; two distinct auricular lobules, the upper flat, with a rounded edge directed backward; auricular opening surrounded by about 15 scales; first and fourth labials distinctly smaller than second and third; subocular labial well elevated, as high as its width on labial edge; sixth labial smaller than seventh, both of which are widely separated from the upper secondary temporal; three large semitransparent scales on eyelid, separated from the subocular by two rows of granular scales; a few small scales on lid anteriorly and posteriorly; a practically complete series of granular scales between palpebral scales and superciliaries; eight lower and nine upper palpebral scales; six lower labials, last greatly elongated; mental wide, deep, with a much wider labial border than rostral; a single postmental; first pair chinshields broadly in contact; second pair much the widest of series; third pair separated by three scales; last chinshield followed by an elongated postgenial, which is bordered on inner anterior edge by a scale longer than wide; lateral and ventral scales about same size; the two median dorsal rows slightly widened; 24 longitudinal scale rows about middle of body; median scale rows following nuchals much wider than the second rows; 28 scale rows around narrow part of neck; 32 behind ear; 30 following arm; all extra rows dropped out at a distance from axilla not greater than the length of the arm; 17 scales about base of tail one centimeter back of anus; a pocket of small granular scales in axilla; scales on

sides parallel; 63 scales in a series from parietals to above anus; 103 subcaudal scales, very slightly widened; six preanal scales, the median enlarged, the outer overlapping inner; the line dividing the lateral neck scales from the postauricular scales curving sharply forward; the line from the lateral nuchal scales and suprabrachial scales nearly vertical from anterior line of insertion of arm; twelve scales about insertion of arm; fourteen about insertion of hind limb; palm with about fifteen rather flat granules, with some smaller granules between these and bases of fingers; lamellar formula of fingers: 5; 8; 10; 12; 9; & 5; 8; 12; 12; 9. Heel with three or four larger scales, those on sole not conspicuously enlarged, but the rows directed to the base of the fourth toe somewhat larger than others. Lamellar formula of toes: 6; 8; 11; 13; 8; & 6; 9; 12; 13; 8. The specimen is a female containing small eggs in the ovaries.

Color. Above a definite bronzy-olive to bronze-brown, the color extending to but becoming slightly darker on the tail; head of about the same color; a lateral brownish streak, more pronounced anteriorly, begins back of eye and continues along neck and on the side, but cannot be traced onto the tail. Careful scrutiny of the dorsal surface shows the first and second scale rows slightly browner, the third and part of fourth rows slightly lighter; upper labials light brown above, growing lighter on lower edges; nearly white on sixth and seventh labials; the light color surrounds ear save at upper posterior corner; chin and throat whitish; a dim light spot above ear; abdomen ashy-gray; lower side of tail light blue, each scale showing a darker portion; limbs darker above than back, lighter below than abdomen; preanal scales light; a faint suggestion of a median lighter line under tail.

Variation. The table of measurements shows clearly the variation in measurement.

Variation in squamation: Scales from occiput to above anus, 61-63, the first number appearing in two specimens. Scale rows on neck, 28-30; about middle of body, 24-26; supraoculars, upper and lower labials, postmentals, postnasals, subcaudals, loreals, superciliaries, frontonasal show no variation in number or appreciable variation in size and relationships. One specimen has the two postlabials fused into a single large scale. The subdigital lamellae under fourth toe, 12-14, the first number being most frequent. Postsuboculars, 3-3 or 4-4, the former number most frequent. Little or no variation is discernible in the general size and relationships of the temporals. Young specimens have blue tails. Variation in color and markings is discussed elsewhere.

Measurements of *Eumeces humilis* Boulenger

Museum Number* Sex	Mich.U. 70516 ♀	Mich.U. 70103 yg.	K.U. 13161 yg.	Brit. M. Type ?
Total length	185	.....	125	131
Tail	120	.....	78	58†
Snout to vent	65	26	47	73
Snout to eye	4.5	.....	.....	.....
Snout to ear	10.5	6	.....	.....
Snout to foreleg	17.5	10.2	15	.....
Foreleg	11.2	8	10.5	17
Axilla to groin	40	.....	27	.....
Postanal width	7.5	2.3	4	.....
Hind leg	17.5	10.3	13	22
Longest toe	6.3	4	5	.....
Adpressed limbs separated	12.0	.....	1	.....
Head length	10	3	7.5	12
Head width	8	2.6	6	10
Body width	13	2.5	6	.....

* Nos. 70103, 70516, Guadalupe Mts.; 13161, Near Mouth Carlsbad Cavern, N. M.; British Mus. No. 83, 4, 5, 33, 34, Presidio, Sinaloa, Mexico.
† Regenerated.

Remarks. The specimen described was collected by Walter Mosauer near Frijoles, Tex., where "it was found slipping through moist vegetation at the margin of the miniature pond formed by the spring." His second specimen came from Dark Cañon. Both localities are in the Guadalupe mountains. Both localities are high, the first approximately 6,000 feet, the second 5,500 feet.

The single specimen collected by myself was found in a pile of drift at the edge of Black river, which flows partly above and partly below ground in the Carlsbad region.

The species appears to be related to *Eumeces multivirgatus,* and the scale formulae and patterns, as well as the general body contours, are approximated by that species. That the ranges of the two forms overlap, each maintaining its identity, should preclude the possibility of these forms being regarded as subspecies. The very striking differences in markings and color should assure their proper identification.

Distribution. The known records (assuming that the type locality is indeed Mazatlán rather than Durango) show the range to extend from southern New Mexico, south through Texas, to Sinaloa,

presumably including territory in Chihuahua and Durango; not improbably is it also present in Sonora. Since Presidio, Mazatlán, is near sea level, the vertical distribution is from this point to about 6,000 feet.

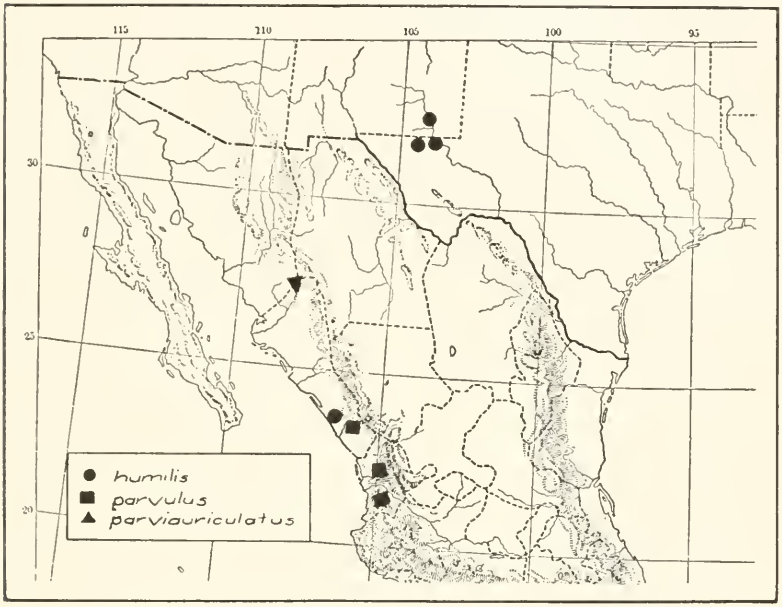

FIG. 59. Distribution of *Eumeces humilis* Boulenger, *E. parvulus* Taylor and *E. parviauriculatus* Taylor, in Southern United States and Mexico.

Locality records:

NEW MEXICO: *Eddy Co.:* Black river, 2 miles east of entrance of Carlsbad Caverns (K.U. 1).

TEXAS: *Culberson Co.:* Near Frijoles, Guadalupe Mts., 6,000 ft. (Mich. 1); Dark Cañon, 5,500 ft., Guadalupe Mts. (Mich. 1).

SINALOA: Presidio (type locality) (Brit. Mus. [83. 4. 5. 33. 34] 2, Forrer Coll.).

Eumeces parvulus Taylor

(Plate 31, Figs. 3, 4; Figs. 59, 60)

SYNONYMY

1933. *Eumeces parvulus* Taylor. Proc. Biol. Soc. Washington, XLVII, Oct. 26, 1933, pp. 175-178, fig. 1 (type description; type locality, Tepic, Nayarit, Mexico).

History. The complete history of the type is not known to me. It was received at the U. S. National Museum from the collection of Julius Hurter, of St. Louis, and purports to come from Tepic (the name presumably referring to the city rather than to the old terri-

tory of that name), Nayarit. The date of collection is April 10, 1910. The specimen was tentatively identified as *Eumeces lynxe* Wiegmann. The U. S. National Museum Catalogue number of the type is 56903.

A second specimen, collected by J. C. Thompson, is likewise in the U. S. National Museum (No. 51395), from Miniman, Nayarit. This was originally identified as *Eumeces brevirostris* Günther, since it is a young specimen and superficially resembles that species.

A third, and, apparently, a very anomalous, specimen has been tentatively assigned to this species. It was collected by Dr. E. W. Nelson and E. A. Goldman at "Plumosas*," Sinaloa. Only future collections can verify whether the supposed anomalies are such, or characters of a distinct species. My judgment has been based on the fact that the fusion of the prefrontal and frontonasal scales as obtains in this specimen has been noted in individuals of certain other species.

Diagnosis. A small species, having a dorsolateral line beginning on rostral, passing back on side of head and neck, and disappearing about the middle of the back; a lateral light line from rostral to ear, following the lower edge of labials; no median light line or "bifurcating lines" on head; four supraoculars; no postnasal; one postmental; parietals enclose interparietal; frontonasal touches frontal; a relatively very large primary temporal, larger than lower secondary temporal, and in contact with it. Twenty-four scale rows about the middle of the body; postgenial large, bordered on inner edge by a scale wider than long. Adults tend to lose all markings.

Description of type. Part of rostral, appearing on anterior tip of snout, small, separated from frontonasal by the paired supranasals; frontonasal broader than long, angular anteriorly, rounded posteriorly, forming a considerable suture with the frontal, and in contact laterally with the anterior loreal; frontal more than a third longer than its distance from tip of snout, truncate anteriorly, rounded behind, constricted at a point about one third of its length from the posterior edge, broadly in contact with the three anterior supraoculars; frontoparietals distinctly rectangular, making a median suture less than one third of their length; interparietal rather small, broadly enclosed by the parietals; first pair of nuchals very large, nearly twice the depth of the second pair; nasal small, distinctly divided; first loreal distinctly higher, but narrower than the second.

* This is Plomosas, a mining town of the municipality of Rosario, near the southern boundary of Sinaloa.

in contact with second and third labials; two presuboculars; six superciliaries, the first nearly twice the area of second; four supraoculars, the third widest, first touching the prefrontal; three postsuboculars; the single primary temporal almost as large as the upper secondary temporal, and of much the same shape; the lower secondary temporal somewhat fan-shaped, smaller than the primary temporal; tertiary temporal elongate.

Seven upper labials, four preceding the subocular, the first higher than the three following and equally as high as subocular; the seventh upper labial largest, followed by a pair of postlabial scales,

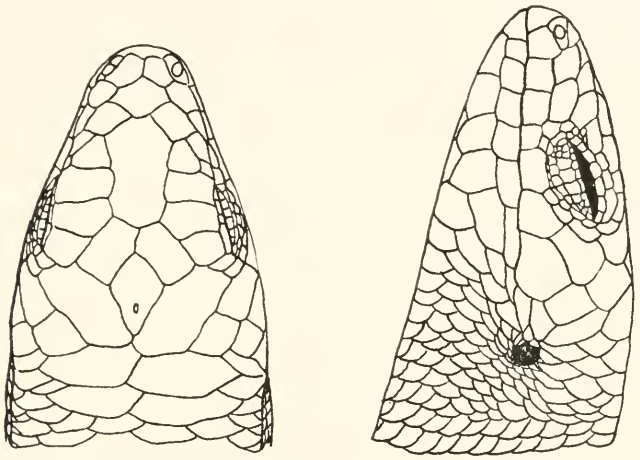

FIG. 60. *Eumeces parvulus* Taylor. U.S.N.M. No. 56903, type; Tepic, Nayarit, Mexico. A, lateral view of head; B, dorsal view of head. Actual head length, 9 mm.; width, 7 mm.

of which the lower is narrow, longer than the upper; these are separated from the minute ear lobules by two or three very small scales; seventh labial largest, not in contact with the upper secondary temporal and separated from ear by a distance less than its length; six lower labials; mental large, forming a longer labial border than rostral; a postmental and three pairs of chinshields, the last pair followed by an elongate postgenial scale which is bordered on its anterior inner edge by a scale much broader than long; diameter of eye about equal to distance from nostril, but distinctly shorter than distance to ear; the median palpebral scales in direct contact with the superciliaries; lower eyelid with a series of four enlarged opaque or semitransparent scales separated from the subocular by two or three scale rows, the lowermost largest. Ear

moderate, surrounded by about 14 to 15 scales; the line separating the postauricular series from the lateral nuchal series vertical and separated from ear by five scale rows; scale rows around neck behind ear, 27; about constricted part of neck, 24; about body in axillary region, 31; about middle of body, 24; the axillary series are all dropped at a distance from axilla a little greater than length of the foreleg. The scales on back are rather small, rounded behind; the median rows not larger than other dorsals, but dorsals are all larger than laterals or ventrals. Limbs short but rather stout; palm, bearing a few enlarged, rounded scales, with several smaller granules; foot without distinctive scales save about heel; the lamellar formula of fingers: 4; 6; 9; 10; 5; of toes: 3; 7; 9; 13; 5. The two median preanal scales somewhat enlarged; three small lateral preanal scales on each side, the outer of which overlap the inner; subcaudal scales slightly wider than adjoining scales; 63 scales in row from parietals to above anus.

COLOR (in alcohol). Above brownish-olive; dorsolateral light line beginning on snout passes back along head and follows, first the third, then the fourth scale rows; it disappears about middle of body; the dorsal ground color is eight rows wide on middle of body; a brown lateral stripe from the rostral passes back along the side of head and body, where it shows dimly, covering two scale rows; a lateral line begins on the rostral, but terminates at the ear after passing along the lower edges of the labials; chin and lower labials cream; the remainder of the lower surfaces grayish; preanals and

Measurements of the type and paratypes of *Eumeces parvulus* Taylor

Museum Number	U.S.N.M. 56903	U.S.N.M. 51395	U.S.N.M. 47667
Snout to vent*	51	37	28.5
Snout to foreleg	14	13	9
Snout to ear	8.3	8	6.3
Snout to eye	3.2	3	2.2
Head greatest width	7	5	4.5
Head length	9	7	4.6
Axilla to groin	32	20	15
Postanal tail width	5	3.6	2.7
Foreleg	9	8	6.3
Hind leg	14	12	8
Longest toe	6	3.6	2.2

* Tail either broken or incomplete in all specimens. No. 51395 measures 50 mm., with the latter part missing, but regeneration begun.

the under side of limbs lighter; the grayish color of belly borders the brown lateral stripe.

Variation. Two additional specimens, No. 51395 U.S.N.M., from Miniman, Nayarit, Mexico (Coll. J. C. Thompson) and a second, No. 47667 U.S.N.M., collected at Plomosas, Sinaloa (Coll. Nelson and Goldman), are at hand for comparison.

The first of the two shows the following variations in scalation: 62 instead of 63 scales from head to above vent; about 15 scales around ear; there are 14 instead of 13 lamellae under longest toe; the adpressed limbs are very narrowly separated when adpressed, while in the larger specimen they are separated by eight millimeters. The color of this specimen is darker, appearing brownish above with the dorsolateral lines cream color and well differentiated to about midway on body. The lateral stripe is difficult to differentiate from body color; chin and throat cream; the color of the abdomen appears somewhat in darker and lighter lines, a character also visible but dim in the type; under side of tail lighter than abdomen, the median scale row with a lighter streak; regenerated tip of tail, cream.

No. 47667 U.S.N.M. from Plomosas, Sinaloa, Mexico, shows a number of abnormal peculiarities. The frontonasal and prefrontals are fused into a single scale and this separated from the frontal by a partly obliterated suture; the posterior constriction of the frontal is very slight; the enclosed interparietal is as broad as long; the anterior temporal is as large as upper posterior, but both are slenderer in type; the head appears to be proportionally wider; there appears to be only 22 scale rows (the specimen has been injured, and it is difficult to make an accurate count at middle of body); other scales and markings are similar, generally, to type. The color above is grayish-brown, the lateral brown line very distinct.

If the character of the fused frontonasal and prefrontals were not abnormal, it would be necessary to recognize this as a distinct species. However, I strongly suspect it is abnormal and, for the time being, it will be placed under this species. Similar anomalies have been observed in specimens of several other species.

Remarks. The relationship of the species is not clear. It appears to show more characters in common with *Eumeces parviauriculatus*, as I have suggested under that species, than with any other member of the genus.

Distribution. The known distribution includes localities in southern Sinaloa and Nayarit. (See Fig. 59 for distributional map.)

Sinaloa: Plomosas (U.S.N.M. 1).

Nayarit: Tepic (type, U.S.N.M. 1); Miniman (U.S.N.M. 1).

Eumeces parviauriculatus Taylor

(Plate 31, Fig. 5; Figs. 59, 61)

SYNONYMY

1933. *Eumeces parviauriculatus* Taylor. Proc. Biol. Soc. Wash., XLVI, Oct. 26, 1933, pp. 178-181, fig. 2.

History. The type specimen, United States National Museum No. 47536, was collected by Mr. Edward A. Goldman at Alamos, Sonora, January 5, 1899, when en route to California from the Sierra Madre in western Chihuahua. Probably due to the poor state of preservation the specimen was tentatively identified at the museum as *E. brevirostris,* to which species it bears a superficial resemblance. In 1933 privilege of describing the species was granted me by Dr. Leonhard Stejneger.

The species is tentatively assigned a place in the *Multivirgatus group,* but is not closely related to other members of it. It is apparently a diminutive form, although absence of the viscera precluded an examination of the sex organs to determine the age of the type. It does not, however, appear to be a young specimen. In the character of the scales overlapping the auricular opening the species resembles *egregius.*

Diagnosis. A small, slender species, with a distinct dorsolateral line beginning on rostral, and continuing posteriorly on sides, losing itself on the back; a lateral line begins on rostral and continues across labials and ear to forearm, where it is lost; one postmental; no postnasal; parietals not enclosing interparietal; four supraoculars, three touching frontal; seventh labial largest of series, but relatively small, scarcely larger than sixth, and separated from the extremely small auricular opening by a distance greater than its length; primary temporal large, in contact with the very large lower secondary temporal; postlabial scales overlap edge of auricular opening; 20 scale rows around body; subcaudals somewhat enlarged; two pairs of nuchals; small tubercular scales behind and above the insertion of forearm.

Description of type. The part of the rostral appearing above, very small, separated from the frontonasal by the pair of supranasals which form a median suture; frontonasal much broader than long, pointed anteriorly, rounded posteriorly, touching anterior loreal; prefrontals small, widely separated, their sutures with frontal equal to that with the frontonasal, also forming sutures with the two loreals, the first superciliary and first supraocular; frontal broad and elongate, much longer than its distance from end of the snout,

and distinctly constricted at a point about one third the distance from the posterior end; frontoparietals very much larger, at least double the size of the prefrontals, and forming a moderately long median suture; interparietal wide and short, not enclosed by the parietals; a pair of well-developed nuchals followed by a second pair (scales broken on left side); nasal small, the nostril directed strongly forward and downward; two loreals, the anterior high, touching first and second labials, somewhat rectangular; posterior loreal somewhat rectangular, touching the second and third labials; four supraoculars, the anterior nearly triangular, forming a small suture with prefrontal, the third widest, forming an angular wedge between the frontal and frontoparietal (on right side, due apparently to an injury, the two first supraoculars are partly fused and these fused with the first supereiliary); five supereiliaries, the first not greatly larger than second; two presuboculars; three postsuboculars; primary temporal large, larger on left side than right side, larger than seventh labial, broadly in contact with the lower secondary temporal; the upper secondary temporal largest, smaller on left than right side; the lower secondary temporal nearly square, forming an elongate suture below with a very narrow elongate postlabial; second postlabial separates the two scales from the auricular opening, and overlaps its edge; the tertiary temporal small, separated from auricular opening by second postlabial; seven labials, last largest, but not greatly larger than sixth; the subocular very low, distinctly lower than first labial; the first labial much higher than three succeeding; six lower labials; postmental large, single; three pairs of chinshields, the first pair broadly in contact, second separated by a single scale, last pair followed by an elongate postgenial bordered internally by an enlarged scale much wider than long.

The larger scales in front of and above auricular opening overhang it; no lobules can be observed; about ten minute scales about border of ear; eye small, as long as, or slightly longer than, its distance from nostril, much less than its distance from ear; the line dividing the postauricular scale series from the lateral nuchal series curves strongly forward; the scales of the median row following nuchals much widened; on body the median rows of scales are somewhat wider than adjoining series, the posterior edge of scales not curved, but practically parallel with the anterior edge.

Scale rows behind ear, 25; on constricted portion of neck, 23; behind arm, 26; around middle of body, 20; about base of tail, 15; there are 63 scales in a row from parietals to above anus; the scales

on sides and abdomen are smaller than the median dorsals; the intercalated axillary rows are dropped at a point less than one and one half the length of foreleg from axilla; behind arm and continuing above arm to point of anterior insertion are several rows of small, granular, flattened, nonimbricating scales; anus bordered by a median pair of scales, much enlarged, and two lateral scales on each side, the outer of which overlap the inner; lateral postanal scale elongate, but not otherwise differentiated; subcaudal scales widened, at least two to two and one half times as wide as deep,

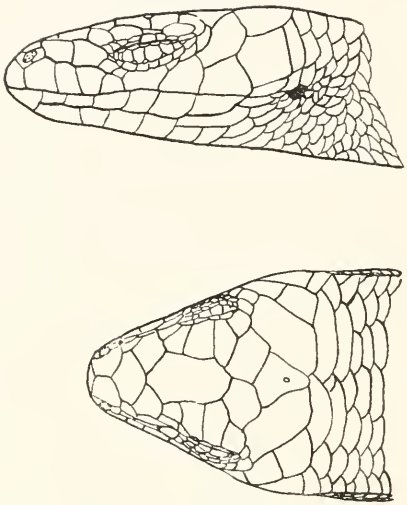

FIG. 61. *Eumeces parviauriculatus* Taylor. U.S.N.M. No. 47536, type. Alamos, Sonora. A, lateral view of head; B, dorsal view of head. Actual head length, 7 mm.; width, 6 mm.

more than a half wider than adjoining scale rows; limbs slender, delicate, very widely separated when adpressed; a few rounded, enlarged tubercles on palm, separated from the series at base of digits by several small granular tubercles; a few enlarged granules on sole near enlarged scutes bordering heel; other scales on sole small; the lamellar formula for fingers: 3; 7; 7; 8; 5; for the toes: 4; 7; 10; 11; 7.

Color (in alcohol, probably much discolored). Above, dark slaty-brown, the scales appearing darker on their sutures, forming indistinct dotted darker lines; a distinct light-colored dorsolateral line from rostral back along sides on the third scale row, which is lost on the posterior part of back; a lateral line beginning on labials

continues back to forearm, involving ear; chin, lower labials, and breast cream; belly dark. A darker lateral band, which passes from the side of head, through eyes, along the side, is difficult to distinguish, but on tail is more distinct, the scales showing large central brown areas with lighter edges.

Measurements of the type of Eumeces parviauriculatus Taylor

Snout to vent	47	Greatest body width	6
Snout to foreleg	14	Axilla to groin	28
Snout to ear	7.9	Postanal tail width	4.3
Snout to eye	3	Foreleg	7.3
Head width greatest	6	Hind leg	10.6
Head length from nuchals	7	Longest toe	4

Remarks. Only a single specimen, the type, has been examined. It is in poor condition; many of the scales have slipped, and the abdomen is somewhat softened. The viscera have been removed. The tail is present, but is broken into two pieces; the tip is regenerated; the forefeet have been dried. Despite all this, none of the essential characters are obscured.

The relationship of the species is not clear. It is probably a degenerate (specialized) form and may be distantly related to *parvulus*. It is probably totally unrelated to the recently described *dicei* Ruthven and Gaige, which, judging by the character of the temporals, belongs to another group to which I have assigned it.

The known *Eumeces* fauna of Sonora is indeed meager, this type specimen being the only specimen I am aware of collected in this large state. *Eumeces callicephalus* and *humilis* Boulenger may be expected to occur. It is not closely related to either *humilis* or *callicephalus*.

The type locality name, Alamos, refers apparently to the city (Municipalidad) in the district of Alamos in the southern part of the state. There are, however, two other places named Alamos, one a pueblo in the district of Ures, and a rancho, of the Municipalidad of Cumuripa, district of Guaymas.

Distribution. The probabilities are that the species, now known only from the type specimen, is confined to the western slope of the Sierra Madre, in Mexico. Alamos is situated in low mountains, bordering the low, narrow coastal plain, about fifty miles from Santa Barbara bay on the Gulf of California, in the state of Sonora.

Locality records. Only the type locality known. (See Fig. 59 for distributional map.)

ANTHRACINUS GROUP

Four forms are included in this group: the two subspecies of *Eumeces septentrionalis* (Baird), *Eumeces anthracinus* (Baird) and *Eumeces copei* Taylor.

It seems probable that this group is most closely related to the *multivirgatus* group, perhaps through *septentrionalis* and *multivirgatus*. *Eumeces copei* is the least typical of the group.

The group may be characterized as one of medium-sized skinks having four well-defined light lines, a dorsolateral arising on the last supraocular (on snout in *copei*) and continuing on the tail; a lateral line from snout (sometimes broken on labials) to the hind leg. A broad lateral brown stripe. The dark dorsal ground color of the young becomes olive, with secondary rows of black dots. Often a secondary (dim) light median line, but no "bifurcating" lines on head; one or two postmentals; no postnasal; limbs not or but slightly overlapping; seven upper labials; postgenial bordered by a scale longer than wide (except in *copei*).

KEY TO THE SPECIES OF THE ANTHRACINUS GROUP

A. Four dorsal rows of scales widened; the postgenial bordered by a scale broader than long, on its inner edge; dorsolateral line originates on the snout; sixth and seventh labials very large; primary temporal larger than lower secondary; interparietal proportionately very large; 22-24 scale rows; no median light line; usually dotted dark lines on scale rows of back. Maximum size, 76 mm.; limbs widely separated in adults (15 mm.). (States of Morelos and Mexico, and Distrito Federal, in Mexico) ..... *Eumeces copei* Taylor, page 387

AA. Dorsal scale rows not noticeably widened; postgenial bordered by a scale longer than wide; labials not enlarged more than normal for genus; the primary temporal much smaller than lower secondary; interparietal not larger than usual.

B. One postmental; limbs well-developed, overlapping or touching in all save old females distended with eggs; lateral line passes through ear; 24-28 scale rows, 26 or 28 being most usual, usually two pairs of nuchals. Maximum size, 70 mm. (Eastern United States to Kansas and Oklahoma.)
Eumeces anthracinus (Baird), page 373

BB. Two postmentals; frontonasal variable, in contact or not with the anterior loreal; limbs short, never overlapping save in young; lateral line passes above ear; usually 28 scale rows.

C. Frontonasal small (occasionally fused), frequently in contact with rostral, normally not in contact with the anterior loreal; average of 60 scales from parietals to above anus. Maximum size, 75 mm.; usually a dim median light line to parietal. (Central U. S. from Canada to southern Kansas) ..... *Eumeces septentrionalis septentrionalis* (Baird), page 394

CC. Frontonasal normal in size, in contact normally with the anterior loreal; dim median line frequently absent, usually not reaching head when present; scales from parietal to above anus average 57. (Oklahoma and Texas) ..... *Eumeces septentrionalis obtusirostris* (Bocourt), page 405

Eumeces anthracinus (Baird)

(Plate 32; Figs. 62, 63)

SYNONYMY

1850. *Plestiodon anthracinus* Baird. Journ. Acad. Nat. Sci. Phila., (2), I, 1847-1850, p. 291 (type description: type locality, North Mountain, near Carlisle, Pennsylvania; Baird Coll.); Garman, S., Bull. Essex Inst., XVI, Jan. 9, 1884, p. 15 (Pennsylvania; Mississippi); Hurter and Strecker, Trans. Acad. Sci. St. Louis, XVIII, 1908-1909 (1909), p. 23 (records for Missouri, Oklahoma and Texas); Hurter, Trans. Acad. Sci. St. Louis, XX, 1911, pp. 142, 143 (Warren, Franklin and Jefferson counties, Missouri); Stejneger and Barbour, Check List N. Amer. Amph. Rept., 1917, p. 69; Bishop, Copeia, No. 54, Feb. 17, 1918, pp. 35, 36 (New York records); Wright, Copeia, No. 66, 1919, p. 8 (New York records); Pratt, Vert. Anim. U. S., 1923, p. 206 (Key); Strecker, Baylor Univ. Bull., XXVII, No. 3, pt. 3, pp. 38-42 (detailed notes on occurrence in Arkansas, habits, food, etc.).

1875. *Eumeces anthracinus* Cope. Bull. U. S. Nat. Mus., No. 1, 1875, p. 45 (Pennsylvania to Texas, in mountains); Davis and Rice, Ill. State Lab. Nat. Hist., Bull. 5, 1883, pp. 46, 47; Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 376; Garman, H., Bull. Essex Inst., XXVI, 1894, p. 62; Cope, Ann. Rept. U. S. Nat. Mus., 1898, (1900), p. 662, fig. 135 (description and discussion); Morse, Proc. Ohio State Acad. Sci., IV, pt. 3, 1904, special paper No. 9, p. 125; Surface, Zoöl. Bull. Penn. Dept. Agri., V, No. 8, 1907, p. 251; Ditmars, Reptile Book, 1915, p. 199; Jordan, Man. Vert. Anim. U. S., 12th Ed., 1916, p. 201; Stejneger and Barbour, Check List N. Amer. Amph. Rept., 2d Ed., 1923, p. 74; Strecker, Cont. Baylor Univ. Mus., No. 5, May 15, 1926, p. 6 (Louisiana); Ortenburger, Copeia, No. 155, June 24, 1926, p. 138 (Comanche Co., Okla.); and Uni. Okla. Bull., Proc. Okla. Acad. Sci., VI, pt. 1, 1926, p. 95 (Oklahoma records); Brimley, Journ. Elisha Mitchell Sci. Soc., XLII, Nos. 1 and 2, Oct., 1926, p. 83 (Key); Gloyd, Trans. Kan. Acad. Sci., XXXI, 1928, p. 120 (Kansas record); Burt, Trans. Acad. Sci. St. Louis, XXVI, No. 1, 1928, pp. 49-51 (distribution in Kansas); Roddy, Rept. Lancaster Co., Pa., 1928, pp. 48, 50; Netting, Ann. Carnegie Mus., XIX, No. 3, 1930, pp. 170, 171; Force, Copeia, No. 2, June 30, 1930, p. 29; Stejneger and Barbour, Check List N. A. Amph. Rept., 3d Ed., 1933, p. 80.

1878. *Eumeces anthracinus* var. Cope. Amer. Philos. Soc., XVII, June, 1877, to June, 1878 (1878), p. 64.

1880. *Eumeces pluvialis* Cope. Bull. U.S.N.M., No. 17, 1880 (footnote, p. 19; type description; type locality, near Mobile, Alabama; Dr. Joseph Corson, U. S. A., Coll.); Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 376; Cope, Ann. Rept. U. S. Nat. Mus., 1898 (1900), pp. 663-664, fig. 136; Ditmars, Reptile Book, 1915, p. 200; Stejneger and Barbour, Check List N. A. Amph. Rept., 2d Ed., 1923, p. 77; Haltom, Mus. Paper No. 11, Alabama Mus. Natural History, Univ. Alabama, 1931, p. 119, fig. 57 (after Cope).

1917. *Plestiodon pluvialis* Stejneger and Barbour. Check List N. Amer. Amph. Rept., 1917, p. 71; Löding, Prelim. Cat. Alabama Amph. Rept., Mus. Paper No. 5 (Geol. Surv. Alabama), Sept., 1929, p. 25.

History. Spencer F. Baird described this species in 1850 from several specimens (five cotypes still present in the collection of the United States National Museum) collected by himself on the North mountain, near Carlisle, Pa. Cope (1875), in his check list, records the range of the species from "Pennsylvania to Texas in Mountains," the latter state record seemingly based on specimens collected by Shumard on the Brazos river, Texas. Garman (1884) adds Mississippi to the list of localities. Hurter and Strecker (1909) report the species from Missouri and Oklahoma. Since that time several state reports have been published and its range generally established. Cope (1878) mentions a variety of the species from Mobile, Ala.,

collected by Dr. Jos. Corson, and two years later (Cope, 1880) described this specimen as the type of a new species, *Eumeces pluvialis*. No further specimens were identified as belonging to this until a specimen, collected near Mobile by H. P. Löding, was so classified in the U. S. National Museum.

Cope separated *pluvialis* from *anthracinus*, because there were 26 scale rows, and seven instead of six labials. His statement that it has five supraoculars (and so repeated by Boulenger, 1887) is apparently a *lapsus*. The green lateral and dorsolateral lines of *pluvialis* are typical of young *anthracinus* and, at least often, the color is greenish to greenish-white in many live or recently preserved adults. With an examination of the types of *anthracinus* and a topotype of *pluvialis*, it appears that the characters assigned to *pluvialis* are likewise characteristic of many specimens of *anthracinus*. Thus, in the greater number (more than 95 percent) of the specimens examined, the number of scale rows is 26-28, and the reduced number of labials (six) occurs occasionally in specimens having 28 scales rows. It is significant that the second known specimen identified as *pluvialis* from Mobile has only 25 scale rows. The type of *pluvialis* has a dim median stripe which is likewise usually present in *anthracinus*. Cope, himself, mentioned such a specimen (Cope, 1900, p. 663). Consequently, it seems wisest to regard the two forms as belonging to the same species, and I have here so considered them.

The material available for study consisted of 91 specimens, the larger number being from Kansas, Oklahoma, and Arkansas. The types (No. 3138 U.S.N.M., 5 specimens) are now in very poor condition, faded badly so that the color patterns are effaced, and most of the scales are wanting.

Within the presumed range several states are without locality records. I have found no authentic records of the species in Illinois, Indiana, Virginia, West Virginia, New Jersey, Kentucky, and Tennessee. It seems reasonably certain, however, that the species is present, but rare or difficult to find, since in several other states it is known from very few or only a single record. In eastern Kansas its distribution seems quite erratic.

Diagnosis. A medium-sized species with a maximum head-body length under 70 millimeters; a broad, brown lateral stripe; a dorsolateral light line from last superciliary or supraocular extending onto tail, sometimes bordered above by a dotted brown line; lateral light line from labials to some distance on tail, passing through the

ear, tending to break into spots on posterior labials; a more or less distinct secondary median lighter line, not or rarely edged with a dim, dotted dark line; 24 to 28 scales about middle of body; seven labials; one postmental and no postnasal; scales under tail widened; limbs moderately well developed, overlapping in all young and in adults except older females when distended with eggs; postgenial bordered by a scale longer than wide.

Description of the species (drawn largely from No. 1620. E. H. Taylor Collection, Baxter Springs, Cherokee Co., Kansas): The portion of the rostral visible from above triangular, equal or nearly

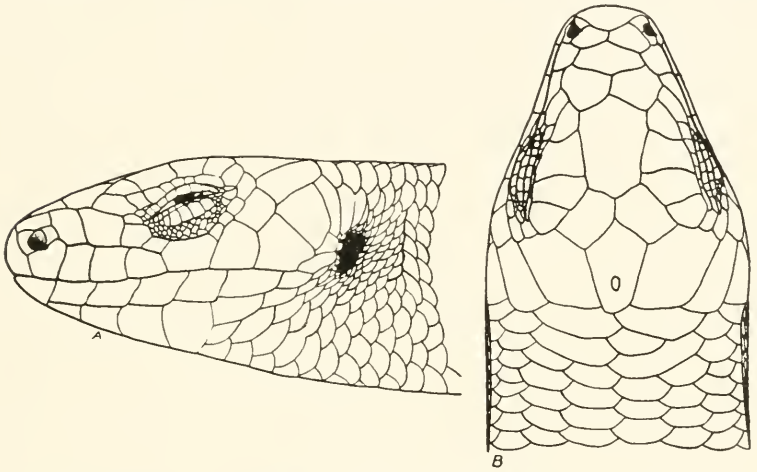

Fig. 62. *Eumeces anthracinus* (Baird). K.U. No. 8221; Imboden, Arkansas. A, lateral view of head; B, dorsal view of head. Actual head length, 10.2 mm.; width, 9 mm.

equal to frontonasal in area; supranasals with edges more rounding than angular, forming a median suture (rarely separated, allowing contact between rostral and frontonasal), normally separated from the prefrontals; frontonasal wider than long, making a suture with the first loreal, separated from the frontal (rarely in contact); prefrontals angular, forming a median suture (rarely not), equal to or somewhat less in size than the frontonasal, forming subequal sutures with two loreals, the first superciliary and first supraocular; frontal obtusely angled anteriorly, nearly a right angle posteriorly, the sides straight, distinctly wider anteriorly than posteriorly, in contact with the three anterior supraoculars, separated from the interparietal; frontoparietals rather regularly rectangular, usually as large as or larger than the prefrontals; interparietal elongate, not enclosed posteriorly by the parietals, which are diagonally elongate

and not greatly widened; two pairs of nuchals (sometimes incomplete or only one pair present), the anterior pair the larger; nasal divided by a suture, the entire scale smaller than supranasal; no postnasal; anterior loreal high and narrow, much higher than posterior, its lower edge forming an obtuse angle between the first and second anterior labials; posterior loreal about as high as long, irregular in shape; eight-nine superciliaries, the anterior large, two to three times area of second, and equally larger than the last vertically-placed superciliary; the four median palpebral scales in contact with the superciliaries; four supraoculars; two presuboculars and four postsuboculars; primary temporal elongate, nearly rectangular; upper secondary temporal nearly twice the length of primary, relatively slender, never in contact with the last labial; lower secondary temporal regularly fan-shaped, touching primary; tertiary temporal elongate, entering ear (sometimes separated by a single scale); two postlabials (normally); seven upper labials (rarely six), the first higher than the four following; subocular low, elongate; seventh labial largest (rarely sixth equals seventh); mental with a slightly longer labial border than rostral; a large, undivided postmental; three pairs of chinshields; a relatively small, elongate postgenial, bordered on its mesial edge by an elongate scale equal to or smaller than the postgenial in size; three or four small but fairly distinct auricular lobules; 19-20 scales about the ear opening; lower eyelid with a series of four or five enlarged opaque scales separated from the subocular by three rows of small granular scales.

Scales on the body generally in parallel rows, but showing some irregularity occasionally on the sides; scale rows behind ear, 34; narrow part of neck, 29 rows; in axilla, 38; about middle of body, 26 rows; about base of tail, 21 rows; from parietals to above vent, 53 scales in a dorsal row; subcaudals, 99 from vent to tip of tail. The dorsal scales are equal (or occasionally apparently smaller in females with body distended with eggs) to the laterals; about equal in size to the ventral series. Eight scales border vent anteriorly; median pair not greatly enlarged, outer preanal scales bordering them much larger than usual in the genus, the outer scales overlapping inner.

Limbs moderately well developed, overlapping in young and young adults, sometimes somewhat separated when adpressed in older specimens, especially females; small granular scales in axilla, and a row usually passing above the limb insertion; a thickened

scale on outer edge of wrist; palm with several enlarged scales separated by smaller granules; lamellar formula for fingers: 5; 8; 11; 12; 7. Heel bordered by four enlarged plates; sole broad, with two differentiated, tubercular scales; other scales subequal and juxtaposed; lamellar formula for toes: 7; 9; 12; 15; 10; terminal lamella of digits not tightly bound about base of claw.

Color. Above, uniform olive-brown from snout to base of tail, where the ground color becomes more olive; a very dim median dorsal line of a lighter brownish shade; dorsolateral lines distinct, arising on the last supraocular, passing along the third scale row to the shoulder, then bordering the edges of the third and fourth to some distance on the tail; this line bordered on the internal border by a dotted line of deep brown; a broad, lateral, deep brown stripe beginning at eye involving upper edge of the auricular opening, covering the equivalent of three whole scale rows, passes back to tail and is continued as a narrow, less-distinct stripe to near end of tail; the centers of the scales in the stripe deeper brown or blackish, suggesting two or three darker lines on the stripe; lateral light line broken into spots on labials, tending to pass through the ear, widens behind it, then narrows, following the middle of the seventh scale row to behind the hind leg; tip of chin dirty white; undersurface of body and tail and lower lateral region greenish or bluish-gray, darker under tail; limbs with indistinct darker areas, the toes lighter, the lamellae beneath dark.

Age groups. The snout to vent measurements recorded for the specimens studied show that they tend to fall into groupings which suggest age groups. At hatching, the measurements are from 21-23 mm.; 2d year, 26-29 mm.; 3d year, 30-34 mm.; 4th year, 35-40 mm.; 5th year, 42-46 mm.; 6th year, 49-51 mm.; 7th year, 53-56 mm.; 8th year, 56-59 mm.; 9th year, 59-60 mm.; 10th year, 61 mm.; 11th year, 62 mm.; 12th year, 63 mm.; etc.

The average expectation for spring collecting is 27 mm. 2d year (but less than one year old); 3d, 32 mm.; 4th, 37.5 mm.; 5th, 43 mm.; 6th, 49 mm.; 7th, 52.5 mm.; 8th, 56 mm.; 9th, 59.5 mm.; 10th, 61 mm.; 11th, 62 mm.; 12th, 63 mm.; 13th, 64 mm. That the evidence of these measurements is not conclusive as to the age groups is admitted, since the number of data is small and in the greater number of specimens the date of collection is not complete. These data may be checked against measurements of series taken at the same locality and at the same time.

Variations. The variations here recorded are compiled from data

Measurements of *Eumeces anthracinus* (Baird)—Eastern and Western Specimens

Museum	A.N.S.P.	A.N.S.P.	U.S.N.M.	Roch. U.	Mich.	U.S.N.M.	M.C.Z.	U.S.N.M.	Field	Field	K.U.
Number	9434	9433	38197	.....	52583	61309	12821	75291	15270	8497	8231
Sex	♀	♂	♀	♂	.....	♀	.....	.....	♂	♂	yg.
Locality (state)	Md.	Md.	Pa.	Miss.	N. C.	N. C.	N. C.	Ala.	Ark.	Ark.	Ark.
Snout to vent	65	62	57	61	57	50	50	50	55	49	43
Tail	.....	.....	.....	118	.....	.....	.....	.....	118	.....	81
Snout to foreleg	20	21	19	18	17.5	18	19	17	20	18	16.1
Axilla to groin	38	34	30.5	35	24	26	.....	29	31	27	22
Width of head	10	9.2	8	8	8	8	.....	7	7.6	7.5	.....
Length of head	10.2	10.2	9	10	9	9	.....	9	9.3	8.5	.....
Foreleg	15	16	13	16	12.2	13	13	15.6	13	12	11
Hind leg	19.2	21	17.5	21	17	17	18	19	19	17	15
Longest toe	6.2	7	7	8	6.2	6.7	7	7.2	7	7	6

NOTE: The cotypes are so softened that measurements cannot be accurately estimated.

Measurements of *Eumeces anthracinus* (Baird)—Western Specimens

Museum Number Locality (state)	K.U. 8840 Ark.	K.U. 8803 Ark.	K.U. 8227 Ark.	Ok. U. 11704 Okla.	Mich. U. 68744 Mo.	K.U. 8223 Ark.	E.H.T. 1620 Kan.	K.U. 8222 Ark.	K.U. 8230 Ark.	O.H.U. 198 Kan.
Snout to vent	22	32	44	50	53	56	60	60	62	64
Tail	28.1	58	81	109	.....	113	108	.....	.....	.....
Snout to foreleg	10	14	15.5	19	18	20	20	19	21	23
Axilla to groin	10.1	15	23.5	27	28	30	35	35	35	35
Width of head	5	5.2	7	8	7.9	8	9	10	9.6	9
Length of head	6.3	6.2	8	9	9.2	9.2	11	11	10.8	10
Foreleg	7.2	9	11	15	13	15	14.3	14	15	15
Hind leg	9	11	15	20	19	22	20	17	21	18
Longest toe	4.1	4.5	6	7.2	7	7.5	7.1	6	7.2	7

taken from the 91 specimens examined. Complete data on all specimens have not been taken since injury or condition may have prevented so doing.

The number of scales in a longitudinal line from snout to vent varies between 50 and 58; the smaller numbers, 50-54, are from Arkansas and eastern states, the higher series, 53 to 56, are Kansas and Oklahoma (topotype of *pluvialis* has 52). Two specimens from Anderson Co., Kansas, have 59 each. In the entire series 53 occurs with greatest frequency. In Arkansas specimens, 52 occurs most frequently. In Kansas and Oklahoma, 53 and 54 are equal. In eastern specimens the more usual number is 51. The subcaudals in the few specimens with complete tails number about 100.

The number of scale rows about the body varies as to the place where the count is made, and it likewise varies when counts are made at the same point on various specimens. Thus, at a point behind the ear, the counts vary between 31 and 38; at the constricted part of the neck, from 28 to 31; about body slightly behind insertion of the foreleg, 32-36; about the middle of the body, from 24 to 30. Only a single specimen (Michigan No. 68450) has 30 scale rows; while only one specimen has 24, and one 25 (aside from the type). These were U.S.N.M. 38197 and 75291 (*pluvialis*), respectively. The numbers 26 and 28 are most common; 26 occurred 13 times; 27, 9 times; 28, 42 times, and 29, only once.

The normal number of labials is seven, four anterior to the subocular labial; the exceptions are few. In specimens examined other than the types, the number 6-6 occurred in three: one from Kansas, one from Arkansas, and one from Pennsylvania. The reduction on one side, 6-7, occurred in 5 specimens, three from Kansas, and two from Oklahoma. The character of the reduced labial series used to differentiate *anthracinus* from *pluvialis* is in reality an abnormality, and in the Pennsylvania specimen mentioned, the point of junction between the third and fourth labials is still obvious. The lower labials are normally six, counting to and including the elongate posterior scale; however, a number of specimens have only five on one side with the normal number on the other.

The normal number of nuchals is one pair; however, in ten specimens out of 90, two pairs were present, and in 14 specimens an extra scale was present on one side or the other; in two specimens the nuchals as such were wanting or broken into smaller scales.

In all specimens examined the postnasal was wanting, and in all but two specimens the postmental is a single scale. In these two there is a complete division.

The number of supraoculars is invariably four, save in two anomalous specimens where a part of the second is segmented, making five, the extra scale being irregularly shaped but touching the frontal, making four supraoculars touching this scale. In all other specimens four is the number of supraoculars, three contacting the frontals. The superciliaries vary between seven and nine, eight being the most frequent number.

The frontonasal varies considerably in the relative length and width. In four cases it forms small sutures with the frontal, but in all others the prefrontals are in contact. The count of scales surrounding the ear varies between seventeen and twenty; the latter number is more frequently present. The ear lobules are very small; two or three are usually discernible. The nasal sutures running above and below the nostril to edges of the scale are deep and separate the two parts of the scale.

The frontonasal is almost invariably in contact with the anterior loreal, three exceptions being noted: two in Kansas specimens in which the small frontonasals are separated from the loreal on both sides, and one in a Pennsylvania specimen separated on one side only. The variation in the number of lamellae under the fourth toe extends from 13 to 18; however, the smaller number rarely appears, and does not seem to be confined to any particular region. However, the western specimens have a slightly higher average, 16 or 17 being the more usual counts, while in the eastern specimens 15 or 16 are more usual. In lamellae under the other digits a similar variation is evident. This is an anticipated condition, since the digits of eastern specimens are on the average slightly shorter than in western and southern specimens. In only three specimens did I find the frontonasal in contact with the rostral—a variation that occurs much more frequently in *septentrionalis*. Presuboculars are normally two, three occurring abnormally in a few specimens, due perhaps to the segmentation of a small portion of the second loreal; four is the normal number of postsuboculars (rarely three).

The temporal scales are quite fixed in their relation to each other, all four being invariably present. In not a single specimen examined is there an exception. The small postlabials—normally two—may sometimes fuse and form a single scale; the tertiary temporal may enter the ear or be separated from it by a single scale. In none did the seventh labial form a suture with the upper secondary temporal.

The variations in color and markings are not great and have to

do chiefly with variation in shades of color, and also in the distinctness of the medial line. In young specimens the dorsolateral and lateral lines are greenish or greenish-white, showing some metallic reflections; in older specimens these lines may be cream, yellowish or whitish. The ventral and ventrolateral surface likewise may change in adults from a greenish to a dirty creamy white on chin, and darker grayish or bluish-gray on abdomen.

In very young specimens the tails are blue; the ground color is dark, almost blackish, and the light lines are very narrow and dim. Instead of the light lines stopping short at the last supraocular, the edges of the other supraoculars have their outer edges with irregular lighter areas that may be contiguous with the dorsolateral line, and so with the scales anterior to these supraoculars. The lateral light line is usually represented anteriorly by a series of light areas beginning on the presuboculars, with a light spot on the three succeeding labials, one in front of the ear, and one following the ear; behind this it is evident as a very narrow line. During the second season the light color of the canthus and the supraoculars fade, so that in older specimens practically no trace of this is in evidence; the dots on the labials change but little and rarely become contiguous; the white spot behind the ear usually is joined with the line and the resultant impression is that the light line passes through the ear. The lateral dark brown stripe varies but little in width, but in many older specimens the scales show central areas that are darker—in fact almost black, thus giving a lined appearance. The dorsal ground color varies through varying shades of black or black-brown (in the young) to light browns, greenish-gray to olive. I have seen a New York specimen and two Pennsylvania specimens pea-green above. This may be due to fading or may be normal. Sometimes the median line is evident, sometimes wholly absent in young, middle-aged and old adults. When present it is usually only a few shades lighter than the ground color and may or may not have a deep brown edge of dotted or continuous color. The dorsal surface of the tail is usually somewhat of the same shade as the dorsal ground color but more frequently than not is peppered with dark brown dots irregularly arranged.

The width of the dorsolateral and lateral lines varies; when passing through a single scale row they are much narrowed; if slightly lower, or higher, bordering the edges of two scale rows, they may be distinctly wider; in the young specimens (second and third seasons), the dorsal and lateral head scales may be heavily edged

with dark brown, and this color may be retained in some adults. There is no trace of markings corresponding to the bifurcating lines on the top of the head. Likewise there is no trace of a light line on the posterior part of the femur.

The head never assumes the much distended condition found in old males of *laticeps* or *fasciatus*, although some specimens (presumably all adult males) have the side of the head tinged reddish or orange during the breeding season.

The amount of pitting on the scales in the young is exceeded in no species of the genus. Practically all the scales on the side of the neck and body, those on the limbs, and, to a lesser extent, those on the outer dorsal rows have the posterior part of the scale with a row of pits six to ten in number. These pits are in evidence in specimens up to a length of fifty millimeters, snout to vent measurement, but become obsolete save in axillary and groin regions of older adults, particularly males.

Size. The maximum size of the species, snout to vent measurement, probably does not exceed 65 millimeters, and only a few examined were above 60 millimeters. A specimen with a perfect tail from Green Co., Miss. (Univ. of Rochester), has a snout to vent measurement of 61 mm., and a tail length of 118 millimeters, totalling 179 millimeters. K.U. Nos. 8230 and 8226 from Imboden, Ark., measure respectively 62 and 63 millimeters, snout to vent, but the tails are broken or regenerated; while the largest specimen seen (64 millimeters) is from Franklin Co., Kansas (Ottawa University, Ottawa, Kan., No. 198). The length when hatching appears to be about 22-24 millimeters in snout to vent measurement, the total length from 46 to 49 millimeters.

The relative proportions of the body change from young to adult. The average proportions in the young are as follows: Tail, 1.4 times head and body length; length snout to forelimb in head-body length, 2.2 times; foreleg into head-body, 3.01 times; hind leg in head-body length, 2.4; axilla to groin distance in head-body length, 2.2. In the largest adults the proportions are as follows: Tail length, 1.77 times head-body length; length snout to forelimb in head-body length, 3.05 times; length of foreleg into head-body length, 4.2; length of hind leg into head-body length, 3.1 times; axilla to groin distance into head-body length, 1.8 times.

In a Pennsylvania specimen (Ronova, Pa., U.S.N.M. 38197) the limbs seem somewhat shorter and the proportions are: length snout to foreleg in head-body length, 3 times; foreleg length in head-body

length, 4.46 times; hind leg length into head-body length, 2.2; axilla to groin distance into head-body length, 1.9 times. It appears that, in general, specimens from the northeastern part of the range have somewhat shorter and slightly heavier limbs.

Remarks. This oviparous species appears to be quite secretive, and as a result a rather small number of specimens have been discovered by collectors.

Specimens which I collected in Anderson Co., Kansas, were found under rocks on rocky bluffs along Pottawatomie creek. In Cherokee county, Kansas, the species was discovered in the neighborhood of a small spring which had a flowing outlet, filled with water cress. While I was searching for salamanders, among the roots of the water cress, a specimen of a skink was routed, apparently having taken refuge among the plants. Search in a scattered pile of small rocks in the pasture land adjoining the rivulet resulted in the capture of 15 specimens of varying sizes. Certain ones near the water would take refuge in the water, diving among the cresses. One specimen was later taken in woods under a log. Apparently they are wholly terrestrial or fossorial, although the burrows observed merely consisted of a runway under a rock. Stomach contents show a variety of insects constituting their food, as well as certain other types of small invertebrate animals.

Gloyd (1928) obtained eight eggs from a captive female which were laid June 21-23, and hatched July 24-25, approximately one month after deposition. The eggs averaged 6 x 10 millimeters. The size of newly hatched young is given as 47 mm. total length. When hatched (newly) they were black with blue tails. While Gloyd makes no mention of the dorsolateral and lateral lines, these are discernible in newly hatched specimens of 49 mm. total length (snout to vent, 22 millimeters), although, after preservation in formalin, these lines can only be discerned with difficulty.

The types of *Eumeces anthracinus* (No. 3138, 5 specimens), now in the United States National Museum, are in an extremely bad state and nothing whatever is left of the original color and markings. The scales are largely missing so that accurate data cannot be obtained. The following notes were made:

1. Prefrontals much enlarged, the frontoparietal much reduced; frontal abnormally truncate; first pair of nuchals fused medially; six upper labials, three preceding the subocular.

2. Interparietal larger than others, approaching the size of the parietals; frontal and prefrontals normal; seven upper labials, four preceding the subocular; frontal and frontonasal separated.

3. Typical save only six upper labials, three preceding the subocular. Interparietal normal.

4. Interparietal very large; frontal touches frontonasals; upper labials 7-7.

5. Similar to No. 4, but the frontal separated from frontonasal.

In three specimens the scale bordering inner mesial edge of the postgenial is wider than long.

The type of *Eumeces pluvialis* Cope has been lost and I propose to designate U.S.N.M. No. 75291 as a neotype of the form. Were one to separate *pluvialis* from *anthracinus* on the basis of the characters pointed out by Cope, it would likewise be necessary to separate the western populations from both on similar slight and variable characters. Unless large series of specimens in the southeastern part of the range can be brought together that show some differential characters now not known to exist, one is left no alterna-

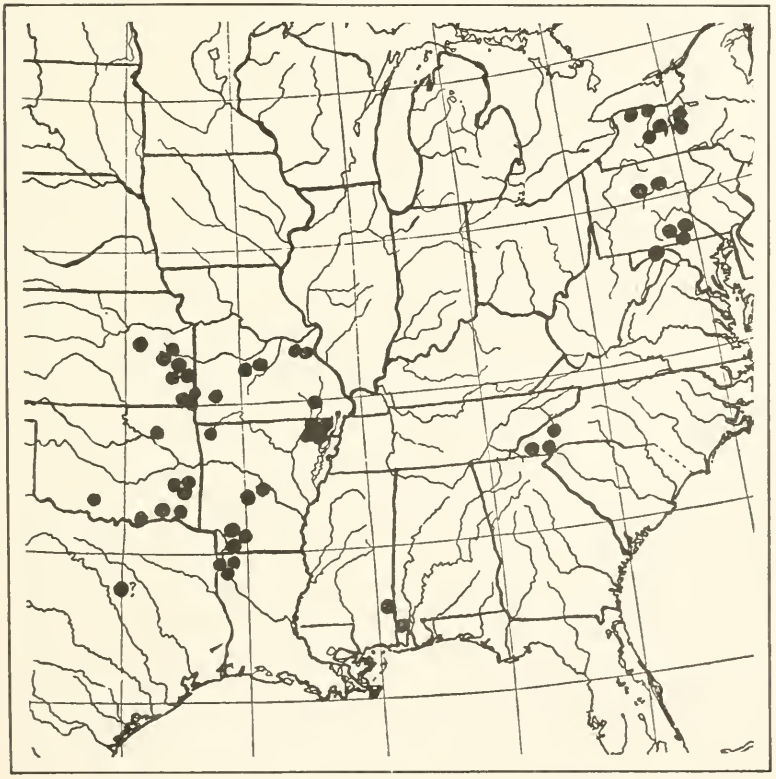

FIG. 63. Distribution of *Eumeces anthracinus* (Baird), in the United States.

tive other than to regard it a synonym of *Eumeces anthracinus* (Baird).

Distribution. This species is widely spread over the eastern half of the United States, and its range is rather similar to *E. fasciatus* save that its northern range (particularly in the northwest) may be more restricted. The absence of specimens in collections from several states where one may presume the species occurs (Illinois, Indiana, Ohio, Virginia, Kentucky, Tennessee, Georgia, etc.) argues that they may eventually be discovered in Iowa, Wisconsin, Michigan, and Nebraska. As has been suggested, the species seems erratic in distribution, and even in states where it occurs, the localities where it has been taken are few in number.

Locality records:

Pennsylvania:

Clinton Co.: Renova (U.S.N.M. 1).
Cumberland Co.: North mountain, near Carlisle (type locality) (U.S.N.M. 5, cotypes).
Clearfield Co.: (Carnegie M. 1).

New York:

Tompkins Co.: Caroline (Cornell 1).
Orleans Co.: Bergen Swamp (Wright, 1919).
Monroe Co.: Irondequoit Bay (Bishop, 1918).
Ontario Co.: Bristol Hills, near Academy (Bishop, 1918); Fishers (Bishop, 1918).

Maryland:

Allegheny Co.: (A.N.S.P. 2).
Unidentified locality: Mt. City Gap, Md. (Cornell U. 1).

North Carolina:

Transylvania Co.: Chubb Gap, Pisgale forest (Mich. U. 1); Looking Glass (U.S.N.M. 1).
Buncombe Co.: Asheville (E. H. Taylor 1, Gloyd Coll.).

Alabama: *Mobile Co.:* Mobile (U.S.N.M. 1, *pluvialis* neotype).

Mississippi: *Green Co.:* Gaines Creek (Univ. of Rochester 1).

Louisiana: *Caddo Co.:* Gayle (K.U. 1) (Mich. U. 1) (Field 1); side of Wallace Bayou (Strecker, 1926).

Arkansas:

Lawrence Co.: Imboden (K.U. 19) (Cornell 2) (Carnegie 1) (Mich. U. 3) (M.C.Z. 7).
Lafayette Co.: Lewisville (K.U. 7).
Benton Co.: (Mich. U. 1).
Garland Co.: Hot Springs (Strecker, 1924).
Saline Co.: (E.H.T. 1).

Missouri:

Carter Co.: Near Van Buren (Mich. U. 1).
Jefferson Co.: Peveley (U.S.N.M. 1) (Baylor 1).

La Clede Co.: (Hurter and Strecker, 1909).
Miller and Pulaski Cos.: Rubidaux Creek (Mich. U. 1).
Barry Co.: Near Rockhouse Cave (A.M.N.H. 1).

KANSAS:
Anderson Co.: Near Glenlock (K.U. 1).
Franklin Co.: Ottawa (Ottawa U. 1).
Dickinson Co.: (K.U. 1).
Miami Co.: Pigeon Lake (Mich. U. 4) (Ottawa U. 1).
Cherokee Co.: Near Baxter Springs (E.H.T. 8) (A.M.N.H. 3).

OKLAHOMA:
Latimer Co.: (Okla. U. 13).
Bryan Co.: (Okla. U. 1).
Comanche Co.: (Ortenburger, 1926).
Pushmataha Co.: (Ortenburger, 1926).
Tulsa Co.: (Ortenburger, 1926).
Choctaw Co.: Fort Towson (Cope, 1900).

TEXAS: Only a single record. Cope, 1900, "Brazos River," Shumard Coll., U.S.N.M. 2. These specimens are apparently lost and the record may be regarded as doubtful.

Eumeces copei Taylor

(Plate 33; Figs. 64, 65)

SYNONYMY*

1885. *Eumeces brevirostris* var. Cope. Proc. Amer. Phil. Soc., XXII, Jan.-Oct., 1885, 387; Cope, Bull. U. S. Nat. Mus., No. 32, 1887, p. 46 (part.).
1933. *Eumeces copei* Taylor. Proc. Biol. Soc. Washington, XLVI, June 30, 1933, pp. 133-137, fig. head, enlarged, dorsal and lateral views (type description).

History. This species was first given a name as recently as June 30, 1933. However, its original discovery in either the valley of Mexico or the neighboring one of Toluca was made by C. T. Hoege in 1884 or 1885.† In the latter year, Cope published a short description of the specimen (No. 32291, U.S.N.M.) under the name *Eumeces brevirostris* Gthr. *var.*, but failed to name the variety. Cope likewise had access to another specimen (No. 7037) in the National Museum lacking all data save the locality "Mexico." This specimen was entered in the Museum catalogue much earlier than the other, and its date of discovery, now lost, certainly antedates that of the specimen collected by C. T. Hoege. This specimen is so badly faded that the color pattern is all but lost. It is small wonder that no one has placed a specific name on the tag.‡

* Possibly also *Plistodon lynxe* Cope, Proc. Acad. Nat. Sci. Phila., 1865, p. 197 (Tableland and Southern Mts. Mexico; Sartorius Coll.).

† Kellogg, Bull. U.S.N.M. No. 160, 1932, p. 9.

‡ This may be the specimen mentioned by Cope (1865) as *Plistodon lynxe*, collected by Doctor Sartorius, in Tableland and Southern Mountains of Mexico, later referred to *brevirostris* (Cope, 1887).

Since neither of these specimens bore a definite locality, the type was chosen from a series of specimens obtained by Hobart Smith and myself, from near Asunción in the western part of the state of México, Mexico, August 4, 1932. It is No. 3859 of the Taylor-Smith Collection, in excellent condition, save that it is somewhat darkened by preservatives.

In the Museo Nacional de México there is a specimen of this species, presumably from the mountains from between Mexico City and Toluca, state of México, which is labeled *Eumeces herrerae*. A search through available Mexican publications, and inquiries failed to exhume a published description. This does not preclude the possibility that such a description exists, in some journal, or that the description was privately printed.

The species has been placed tentatively in the *Anthracinus* group, although it differs from the other members in having a reduced number of scale rows, with dorsal series widened, the dorsolateral lines originating on the snout in the young instead of on the last supraocular, the sixth and seventh labials greatly increased in size, with the primary temporal larger than the lower secondary, and the upper secondary likewise proportionally smaller. The interparietal is proportionally larger than in all other species.

Diagnosis. A moderately large form, having well-defined lateral and dorsolateral whitish lines extending the length of the body, but lacking any trace of a median white line or forking light lines on the head; the limbs small, widely separated (in adults) when adpressed on sides of body; four supraoculars, three touching the frontal; two pairs of nuchals; seven labials, last largest or equal to sixth; a single postmental; no postnasal; large primary temporal in contact with lower secondary temporal and equal or larger in size; a broad scale bordering the postgenial on its anterior median side. Scales in 22 or 24 rows about the middle of the body, the median rows somewhat widened.

Description of the type. Adult female. Rostral § moderately high, the part visible above one third, or less, the area of the frontonasal; latter in contact with the frontal and forming sutures with supranasals, prefrontals, and the anterior loreal; prefrontals quadrangular, the longest side forming the frontonasal suture; the sutures with the frontal next in size; that with the second loreal larger than the sutures with anterior loreal, superciliary or anterior

§ In the original description the statement which reads "Rostral moderately high, the part visible above one-third, or less, than the area of the frontonasal, in contact with the frontal and forming sutures with nasals, prefrontals, and the anterior loreal," should read as here given.

supraocular; frontal large, broad anteriorly, the anterior end a very obtuse angle, as is the posterior, in contact with three supraoculars; two irregularly rectangular frontoparietals, forming a median suture one third their length; interparietal large, broad, not enclosed by the parietals; parietals large, irregularly hexagonal; two pairs of nuchals, the anterior pair largest.

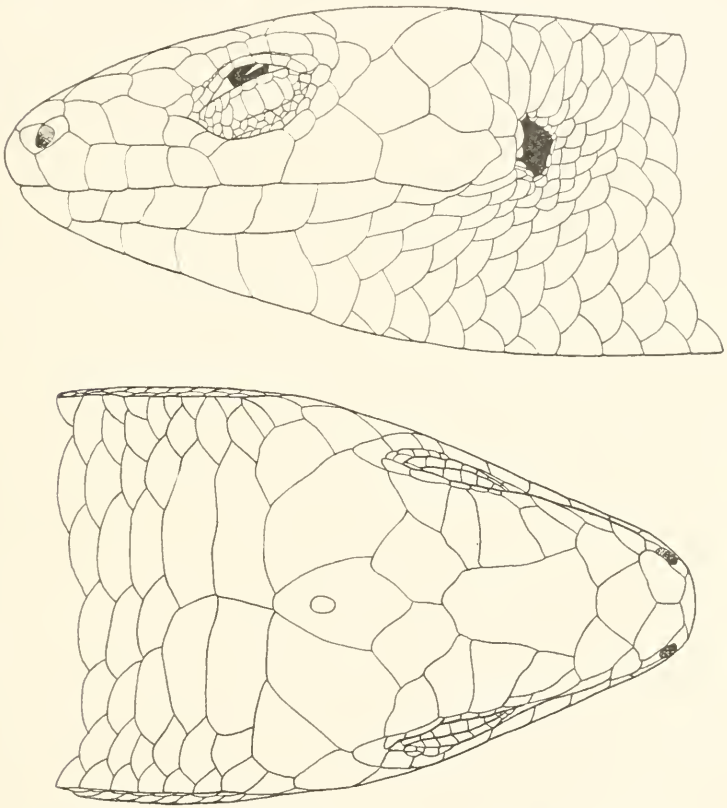

Fig. 64. *Eumeces copei* Taylor. E.H.T. and H.M.S. No. 1827; near Tres Marias, Morelos, Mexico. A, lateral view of head; B, dorsal view of head. Actual head length, 10.2 mm.; width, 8.3 mm.

Nasal relatively small, the part in front of nostril much smaller than the posterior part including nostril; no postnasal; anterior loreal much higher than wide, distinctly higher than posterior loreal, which is longer than high; two presuboculars, the anterior largest; three postsuboculars, the upper largest; primary temporal large, equal in area to and broadly in contact with the lower secondary temporal, separating the seventh labial from the upper second-

ary temporal; tertiary temporal small, elongate, widened medially; a pair of postlabials border anterior edge of the ear, the lower elongate; seven upper labials, four preceding the subocular, of which the first is the largest; sixth and seventh very large, of about same area; eye with four enlarged scales on lower lid separated from the subocular by three rows of minute tubercles; six superciliaries, the anterior large, the second less than half its size; mental large, having a longer labial border than the rostral; a single, large, azygous postmental; six lower labials, the last elongate; three pairs of chinshields, the first in contact medially; the postgenial elongate, bordered on anterior inner edge by a scale broader than long.

Scales on the body large, in 22 rows, larger dorsally than ventrally, the rows parallel on the sides; about the neck posterior to the ear, 28 rows; about narrow part of neck, 26 rows; behind arm, 29 rows, and 15 about base of the tail; scales from parietals to above the anus, 61; scales above and behind insertion of limbs with numerous pits on posterior borders; scales under tail widened, about 2½ times as wide as long; anus bordered by two median preanal scales and two smaller scales on each side, the outer scales overlapping the inner; a very small area of small juxtaposed scales in axilla; lateral postanal scale enlarged but not strongly differentiated.

Limbs small, weak, widely separated when adpressed; palm with several enlarged, rounded scales mixed with smaller; the wrist tubercle on outer edge of under side of wrist not especially enlarged; lamellar formula for fingers: 5; 8; 11; 10; 6; foot with (normally) four enlarged tubercles bordering the heel; usually one enlarged tubercle on the sole with other smaller tubercles; lamellar formula for toes: 4; 7; 10; 12; 9; fourth toe with intercalated lateral scales only at base of the proximal phalanx.

Color in life. Above the general color is a brownish-olive to light chocolate; a very distinct, very narrow, creamy-white, dorsolateral line begins on the rostral, passes back along the sides of the head and along the side of body to some distance on the base of the tail, occupying the median third of the third scale row. A cream-white lateral line begins on rostral, passes along the lower part of the first four labials, then rises somewhat, passing across the upper part of the succeeding labials, reaching middle and upper edge of ear; behind ear it begins on lower half of the ear edge, then bends down slightly, continuing back above arm along the side and to some

distance on the tail. A deep black or black-brown stripe begins on the side of the head, runs along the side, occupying the area between the light lines and bordering the inner edge of the lateral light line; on the median part of the back there are five brown lines; the three median, which follow the edges of the scale rows, are quite distinct, but are much lighter in color and narrower than the deep black-brown lines bordering the light dorsolateral lines; head with a few black-brown spots; below the lateral light line, sides black-brown, each scale with lighter grayish areas forming more or less distinct lighter lines; lower labials, chin, abdomen, underside of limbs and tail dirty grayish to bluish-gray, the preanals showing some brownish color; scales of arm and leg showing irregular light dots, the

Measurements and scale characters of *Eumeces copei* Taylor

Number Sex	Type 3859 ♀	3870 ♀	3871 ♂	3884 ♀	3860 ♀	3864 ♂	3886 ♂	3888 ♂	3896 ♀	3895 yg.	3898 yg.
Snout to vent	76	76	67	65	63	60	55	50	45	34	29
Tail	.....	.....	95	.....	.....	.....	.....	71	.....	49	.....
Snout to forelimb	23	22.2	20.5	18.6	19	20.3	18	16	13	12	11
Snout to ear	12	12.3	12	11	10.8	10.5	10	9.4	8	7	6
Axilla to groin	47.5	45.5	38	40	37.5	34	30	28	28	19	15
Width of head	10	9.5	9.5	9	8.2	9	8.6	7	7	6	5
Length of head	11	10.3	10.2	9.8	9.3	9.5	9.2	8.7	7.7	6.8	6
Width of body	11.5	12	10.5	10	10	9	9.2	8	8.2	7	6.5
Foreleg	13.8	14	15	13.5	14	12.6	13	11	10.2	8.5	7.5
Hind leg	18.2	19.4	20	18	18.2	18	17	16	14	11.2	92
Scale rows	22	24	23	23	24	22	24	22	22	24	24
Interparietal inclosed	no	no	no	no	no	no	no	no	no	no	no
Scales occiput to anus	60	64	63	63	60	60	62	62	64	63	63
Upper labials	7	7	7	7	7	7	7	7	7	7	7
Supraoculars	4	4	4	4	4	4	4	4	4	4	4
Nuchals, pairs	2	2	$2^1/_2$	2	2	2	2	$2^1/_2$	2	2	2
Postmentals	1	1	1	1	1	1	1	1	1	1	1
Postnasals	0	0	0	0	0	0	0	0	0	0	0
Largest labial	7	7	7=6	7	7	7=6	7=6	7=6	7=6	7=6	7=6
Frontonasal touches frontal	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes
Supraoculars touch frontal	3	3	3	3	3	3	3	3	3	3	3
Seventh labial touches upper secondary temporal	no	no	no	no	no	no	no	no	no	no	no

fingers with cream dots on each scale, the toes only partly so; soles and palms bluish-black.

Variation. Detailed data taken on 36 specimens show the following variations: All show a rather decided tenacity to the color pattern described, and moreover it seems to be retained in both sexes to old age with very little change save that the bluish color of the tail is lost early. There is some variation in the shades of brown forming the ground color and in a few specimens the three chocolate lines bordering the edges of the three median scale rows are dim or obsolete; occasionally the dark spots on the dorsal part of the head are wanting.

The scale characters show some variation. The frontal occasionally is separated from the frontonasal (8 times in 36). The parietals fail invariably to enclose the interparietal; the sixth and seventh upper labials are of about equal area, the seventh occasionally the largest; there are invariably four supraoculars, three of which touch the frontal (one exception on one side); seven upper labials (one exception with six on each side); the scales about the ear vary between 15 and 17; invariably one postmental; a postnasal occurs on one side in a single specimen; superciliaries vary between six and seven (five in two specimens). The number of scales from the parietals to above anus varies between 60 and 64, while 62 occurs twice as frequently as any other number. Usually one auricular lobule (rarely two, or none), enlarged. The frontonasal invariably touches the first loreal. The lamellae under the fourth toe vary between 12 and 14, 13 being the most frequent number (two specimens have 16 on one side); postsuboculars usually three (three exceptions with four). In the greater part of the specimens the primary temporal is larger than the lower secondary (which is unusual in the genus) and is invariably in contact with it, thereby separating the seventh labial from the upper secondary temporal. Two specimens show three nuchals on one side. In two specimens the posterior loreal is broken vertically on one side; a single presubocular occurs on both sides in four specimens, on one side in one. The limbs when adpressed fail to touch save in the youngest and smallest specimens (29-34 mm.), where they may overlap one or two millimeters; in the largest specimens (76 mm.) they are separated by a distance of 15 millimeters.

The color of the specimens in preservative is very much darker than in life.

Remarks. The specimens collected by Mr. Smith and myself

were obtained for the most part by turning over rocks on a grassy hillside (elevation about 6,000 feet) or from under logs and bark slabs in a pine forest where logging operations had been carried on (elevation approximately 9,500 feet). The populations were exclusively of this species in these two separate types of localities. In a near-by locality in exactly the same type of forest habitat, the entire *Eumeces* population observed or collected belonged to *indubitus*. Our first encounter with *copei* occurred when Mr. Smith routed a single specimen from under a rock in a lava field near Tres Marias, Morelos, in the mountains to the south of Mexico City along the Mexico-Cuernavaca highway, about thirty miles from Mexico City, and about fifty miles from the type locality.

The large type series contains 48 specimens of various ages and sexes. An examination of the sex organs failed to disclose whether the form is ovoviviparous or not. All the females examined lack developing eggs in the oviducts; United States National Museum specimen No. 32291 shows five well-developed eggs in the ovaries. The stomachs contain a variety of insects belonging to several families, chiefly coleoptera and blattids. No ants were observed.

The species is named for Edward Drinker Cope, who first noted the form, but failed to give it a name.

Data obtained by correlating the snout to vent measurements of

FIG. 65. Distribution of *Eumeces copei* Taylor, in Mexico.

the series collected in August show the following expected measurements for the first ten years.

1st	2d	3d	4th	5th	6th	7th	8th	9th	10th	11th	12th	'nth'
29	34	..	45	50	55	60	63	65	..	..	..	76

Distribution. Known certainly only from the states of Morelos and México, and the Distrito Federal.

Locality records:

MEXICO:

México (State): 10 miles southeast of Asunción, western Mexico. Type locality (E.H.T. & H.S. 48).

Morelos: Near Tres Marias, along the Mexico City-Cuernavaca highway (E.H.T. & H.S. 1).

Distrito Federal: Santa Lucia (A.M.N.H. 1).

Indefinite localities: Mexico (U.S.N.M. 1); "Either the Valley of Mexico or the neighboring one of Toluca." (U.S.N.M. 1).

Eumeces septentrionalis septentrionalis (Baird)

(Plate 34; Figs. 66, 67)

SYNONYMY

1858. *Plestiodon septentrionalis* Baird. Proc. Acad. Nat. Sci. Phila., December, 1858, p. 256 (type description; type locality given as Minnesota and Nebraska; Rev. Manney Coll.); and Explr. Surv. Railr. Route Pac. Ocean, Zoöl., Vol. X (1853-1856), Rept. Rept., No. 3, 1859, p. 18, pl. 24, figs. 2, a, b, c, d, e, f, g, h (details of figures poor; redescription); ?Hayden, Trans. Amer. Phil. Soc., XII, 1862, p. 177; Garman, Bull. Essex Inst., XVI, Jan., 1884, p. 15 (*under Eumeces*); Pratt, Vert. Anim. U. S., 1923, p. 206 (Key); Stejneger and Barbour, Check List N. A. Amph. Rept., 1917, p. 71.

1875. *Eumeces septentrionalis* Cope. Bull. U. S. Nat. Mus., No. 1, 1875, p. 44; Coues and Yarrow, Bull. U. S. Geol. Geog. Surv. Terr., IV, No. 1, Feb. 5, 1878, p. 87; Cope, Bull. U. S. Nat. Mus., No. 17, 1880, p. 39 (Savannah, Ga.); Cragin, Trans. Kan. Acad. Sci., VII, (1879-'80), 1880, p. 115 (Neosho Falls, Kan.); Yarrow, Bull. U. S. Nat. Mus., No. 24, 1882, p. 40; Hoy, Geol. Wisconsin, I, Rept., p. 423 ("not uncommon as far north as Lake Winnebago"); Davis and Rice, Ill. State Lab. Nat. Hist., Bull. V, 1883, p. 46; Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 374; Higley, Trans. Wis. Acad. Sci. Arts Lett., VII, 1889, p. 160; Cope, Ann. Rep. U. S. Nat. Mus., 1898 (1900), p. 565, fig. 113; Ruthven, Proc. Acad. Sci. Iowa, XVII, 1910, pp. 203-206 (color description, habitat and distribution); Somes, Proc. Acad. Sci., XVIII, 1911, p. 150 (Iowa); Graenicher, Nat. Hist. Soc. Wisconsin, IX, 1911, p. 79 (numerous localities in Wisconsin); Ditmars, The Reptile Book, 1915, p. 199 (general account); Jordan, Man. Vert. Animals of the U. S., 12th Ed., 1916, p. 201; Over, South Dakota Geol. & Nat. Hist. Survey, Bull. 12, Series XXIII, Bull. Univ. S. Dakota, Oct., 1923, p. 20; Stejneger and Barbour, Check List N. A. Amph. Rept., 2d Ed., 1923, p. 77; *idem*, 3d Ed., 1933, p. 82; Blanchard, Univ. Iowa Studies Nat. Hist., X, No. 2, 1923, p. 22; Schmidt, Copeia, No. 154, May 20, 1926, p. 132 (Chippewa Falls, Wis.); Nulting, Rept. Com. State Fauna, Iowa, pp. 1-3; Pope and Dickinson, Bull. Pub. Mus. City Milwaukee, VIII, No. 1, 1928, p. 45, pl. 11, fig. 3 (photograph); Burt, Jour. Kansas Ent. Soc., I, No. 3, July, 1928, p. 63 (Food); Burt, Trans. Acad. Sci. St. Louis, XXVI, No. 1, Aug., 1928, pp. 63-66, fig. 14 (distribution in Kansas and habits); Burt and Burt, Amer. Mus. Nov., No. 381, Nov. 2, 1929, p. 10; Force, Copeia, 1930, No. 2, p. 29 (Tulsa Co., Okla.); ?Patch, Copeia, No. 1, Apr. 24, 1934, p. 51 (Onah, Manitoba, 15 miles east of Brandon).

History. This form has been known since 1858, when Baird described it from specimens in the U. S. National Museum, from

the type locality "Minnesota and Nebraska, collected by Rev. S. W. Manney (Type No. 1356)." Baird (1859) figures the species in considerable detail, giving the type number as U.S.N.M. No. 1356 (pl. 24, Fig. 2). Coues and Yarrow (1878, p. 287) state "Originally described from Minnesota and also known to occur in Nebraska and Kansas." Yarrow (1882) lists three specimens from Fort Ripley, Minnesota (under the number 3156), which, one presumes, are the cotypes; no* mention is made of Nebraska specimens.

Cope (1900) lists the three specimens (No. 3156) from Fort Ripley, Minnesota, received from Governor Stevens. Also, No. 3137 from Sand Hills of Nebraska.

There are at present three specimens in the National Museum bearing the number 3156 from Fort Ripley, Minnesota (collector, Doctor Head), labeled types (cotypes), and it would appear that the above locality should be considered the actual type locality. Since no lectotype has been chosen, I propose to designate as lectotype of *Eumeces septentrionalis,* the medium-sized specimen of the three cotypes No. 3156, having a snout to vent measurements of approximately 70 millimeters. This specimen, particularly as regards the character and relationship of the frontonasal, approaches more closely the norm of the species, while the larger specimen has a reduced number of labials and has the frontonasal scale fused with the prefrontals, which are in turn partially fused; in the smallest of the three cotypes, the frontonasal is reduced to a minute scale, and the labials are abnormal.

In the type description it would appear that the collector's name (Rev. S. W. Manney) may be in error, since later mention of the specimens attributes the material from Fort Ripley to Doctor Head (the present designation), but in Cope (1900) the three specimens are noted as "received from Governor Stevens." It will be noted, too, that the original number as listed by Baird is 1356, while later works and the present catalogue number of presumably the same specimens is 3156, suggesting that the former number is a metathesized form of the latter, and in error.

Coues and Yarrow (1878) report the species in their paper on the Herpetology of Dakota and Montana, without definite locality. Cragin (1880) records a specimen from Neosho Falls, Kan. Yarrow (1882) adds Texas ("northern boundary of Texas") and an authentic Nebraska locality, Fort Kearney. Hoy (1883) reports the

* There is an item, U.S.N.M. No. 5325, listed in this work, of 2 specimens from unknown or doubtful locality. Can these be the Nebraska specimens?

species in Wisconsin. Ruthven (1910) first records the species from Iowa. Over (1923) substantiates the Dakota report, stating it has been taken as far north as Roberts county, and that it is common in the eastern part of the state. Whether the species actually occurs in Montana may be questioned.

Diagnosis. A medium-sized species (maximum size, about 75 millimeters) with (normally) two postmentals and no postnasal; frontonasal small, frequently fused with adjoining scales or absent, not in contact with the anterior loreal; limbs relatively short, not overlapping when adpressed in adult specimens; dorsolateral white line arising on the posterior part of the supraocular or superciliary region, and continuing some distance on tail; lateral white line arising on snout, passing back above ear to some distance on tail; these lines bordered above and below by dark brown, and the entire space between them of the same color; ground color of back usually forming three light-brown lines, usually bordered by darker brown lines.

Description of the species (from No. 6982 *et seq.* Kansas University Museum; collected June 10, 1928, near Onaga, Pottawatomie county, Kansas; E. H. Taylor, collector). The rostral large, the part visible above much larger (sometimes more than twice) than the frontonasal; supranasals normal, generally rectangular, forming a median suture and (usually) separating the frontonasal from the rostral, likewise forming a suture with the prefrontals, separating the frontonasal from the anterior loreal; prefrontals large, pentagonal, forming a broad median suture (usually); forming subequal sutures with the first supraocular, the two loreals (only one on right side) and the supranasals; frontal short, its length not equal to its distance from the end of the snout (occasionally as long as this distance), bordered laterally by two supraoculars (normally three) the second of which is very large; frontoparietals large, irregularly pentagonal, invariably forming a median suture; interparietal moderate, not enclosed by the parietals; parietals very large, broad, truncate behind; two pairs of nuchals (one pair more usually). Nasal scale large, nearly equal in area to the supranasal, its anterior elevation nearly equal to its length and not divided;* two loreals, the anterior somewhat higher, normally touching the prefrontal (failing to do so on the left side); second loreal nearly as high as long; four supraoculars, two or three touching frontal; seven super-

* In most species there are strong grooves emerging above and below from the nostril which divides the nasal into two parts and the shed scale separates along the sutural line. In this form a simple depression may be observable, but the scale does not separate here.

ciliaries, the anterior about three times the size of the second; the last vertical, about size of second; two relatively large presuboculars; four postsuboculars; primary temporal moderately large, broadly in contact with the lower secondary temporal; upper secondary temporal largest; tertiary temporal vertical, narrow, separated from the auricular opening by a single tiny scale; seven upper labials, the first largest of the four anterior, and (usually) highest; the first loreal tends to make a wide notch between the first and second labials; subocular labial longer than high; the sixth and seventh labials with about the same elevation, but the seventh largest and

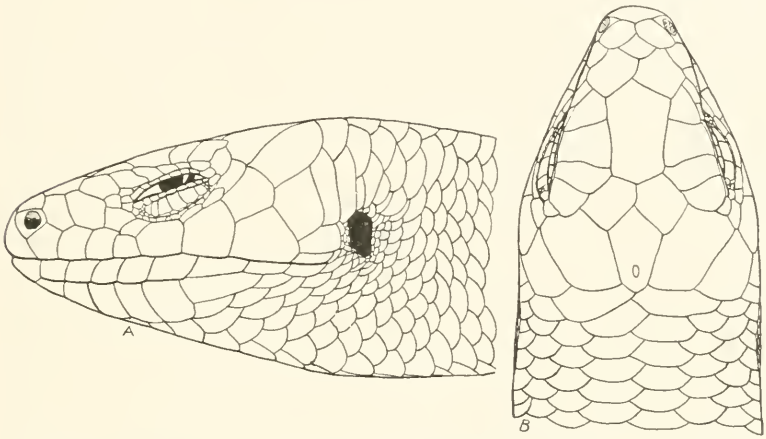

FIG. 66. *Eumeces septentrionalis septentrionalis* (Baird). K.U. No. 6988; five miles west of Onaga, Kansas. A, lateral view of head; B, dorsal view of head. Actual head length, 10.6 mm.; width, 10.2 mm.

longest (usually); two postlabials, upper largest, separated from the minute auricular lobules by three tiny scales; five (usually) lower labials anterior to the elongate posterior (sixth) labial; mental large, with a labial edge much larger than the rostral; two postmentals; three pairs of chinshields followed by the elongate postgenial, which is bordered on its anterior inner edge by a scale longer than wide.

Eye moderate, its length equal to the distance from its anterior corner to the anterior edge of the nostril; the upper median palpebral scales join the superciliaries; lower eyelid with four or five enlarged opaque scales separated from the subocular by two rows of granular scales.

The ear opening of moderate size, surrounded by about 20 scales, the lobules minute, scarcely differentiated; the scales on the body are in parallel longitudinal rows except behind the arm, where the

interpolated series back of the arm are diagonal (some specimens show some irregularity to the groin); pitting on the lateral scales evident, few on sides of neck (2 or 3), while pits may be more numerous on posterior sides of limbs and about insertion of limbs; in the narrow part of the neck there are 30 scale rows; behind arm, 35 rows; about middle of body, 28 rows; on base of tail behind anus, 21 rows; 60 scales in a row from the parietals to above anus; scales under the tail somewhat widened; two enlarged preanals (a median abnormal scale present), bordered laterally by a differentiated preanal, and this by a second smaller scale, the outer preanals overlapping the inner.

Limbs small, widely separated when adpressed (a distance of about 10 scales) the terminal lamellae not tightly bound about claws. Lamellar formula of fingers: 5; 9; 11; 11; 7; of toes: 7; 9; 13; 15; 9. Palm bordered by enlarged scales; on sole of foot, the scales are imbricating, flat, irregular in size. The subcaudals are not greatly widened. (The regenerated tail, however, may show them very strongly widened. The same is true of the dorsal caudal series which in the regenerated tail is quite unlike the original dorsal squamation and is of a different shade.)

Color and markings. Above, the ground color is gray, or olive-gray, forming a slightly lighter putty-colored median line, terminating anteriorly at the interparietal, covering somewhat less than half of each of the two median scale rows; this line bordered laterally by two darker gray lines with brown spotting (frequently well-defined dark brown lines), each about as wide as the median; these darker lines bordered by lines of the gray-olive ground color, each covering approximately one and two thirds scale rows; lying between these and the dorsolateral white (or cream) lines are narrow brown lines less than one whole scale row in width; these originate on the parietals and continue on the tail; the dorsolateral light line definitely originates on the last supraocular and continues as a narrow line to nearly a half the length of the tail, its width rarely more than half a scale, but occupying edges of two scale rows (fourth and fifth); lying between the dorsolateral and lateral lines is a deep brown band originating behind eye (although a few brown spots about and in front of eye suggests that the brown band began farther forward and has become obscured); it continues to some distance on the tail; the light lateral line begins below eye, runs diagonally upward to and above the upper edge of the ear, where after a slight break it passes back, bordering the brown lateral stripe to some distance on the tail; below the lateral white line there is a very narrow brown

line (sometimes not a connected line) bordering it; upper labials generally light from rostral, somewhat edged with darker, gray or brown on their upper edges and with a tiny light spot in each corner of the eye; lower labials and chin, to a lesser extent the throat, breast, underside of limbs and anal plates, creamy white; the lateral and ventral sides of the abdomen and underside of tail a dull, light bluish-gray; limbs above generally like ground color of the body with some darker dots; a whitish black-bordered line on posterior

Table of measurements of Northern Specimens of *Eumeces septentrionalis septentrionalis* (Baird)

Museum..... Number*..... Sex.....	Field 14787 yg.	Field 14792 yg.	Field 14783 ♀	Field 14780 ♀	Field 14782 ♀	Field 14779 ♀	U.S.N.M. 3156 ♂	U.S.N.M. 3156 ♀	U.S.N.M. 3156 ♀
Snout to vent...	32	33	52	62	65	70	57	70	74
Snout to foreleg.	12	11.7	16.8	17	19	19	17.2	20	22
Width of head...	5.5	5.5	7	8.5	8.9	.....	9	9	10
Length of head..	6.3	6.2	9	10	10	.....	10.2	10.1	12
Foreleg.....	8.5	8.2	12	13.7	15	16.5	15	15.2	16
Hind leg.....	10	10.5	15	17.5	18	20.2	19.5	18.4	18
Longest toe.....	3.8	3.6	5	5.5	6	6.3	6	6	8
Axilla to groin...	17	17	31	38	39	41	32	38.2	.....

* Field Museum Nos. from Burnett Co., Wisconsin (Schmidt Coll.); U.S.N.M. specimens are cotypes; specimen 3156 ♀, 70 mm. in length, chosen lectotype.

Table of measurements of *Eumeces septentrionalis septentrionalis* (Baird)—Southern Specimens

Museum..... Number..... Sex.....	K.U. 7781 yg.	K.U. 7784 yg.	K.U. 6992 yg.	K.U. 6987 yg.	K.U. 6980 ♂	K.U. 6993 ♂	K.U. 6979 ♂	K.U. 6990 ♀	K.U. 6985 ♂	K.U. 6988 ♀	K.U. 6982 ♂
Total length.....	55.5	56.8	105.5	117	133	138	178	.....	.....	.....	.....
Snout to vent.....	26	26.2	41.5	47	50	54	64	69	72.5	74	75
Snout to foreleg.....	11	11	12.2	16	17	18	21.5	21	23.5	22	22
Tail.....	29.5	30.6	64	70	83	84	114	.....	.....	.....	.....
Width of head.....	4.5	.....	5.5	6.8	7.2	8	10	10	11	10.2	.....
Length of head.....	5	.....	6.2	7	8	8.2	11	10.9	11.8	.....	.....
Foreleg.....	7	7	11	11.3	12.2	14	15	15	16	15	15.5
Hind leg.....	9	9	15	15.6	19	17	20	19	22.2	20	21
Longest toe.....	3.5	3	5	5.5	6	6	.....	7	7.5	6	7
Axilla to groin.....	12	12	24	26	28	32	35	38	40	40	45

All specimens from Onaga, Pottawatomie Co., Kansas.

side of femur; dorsal surface of tail colored like body, and after the definite dark lines cease, they may be evident as scattered brown dots.

Variation. The material available for the study of *septentrionalis septentrionalis* consisted of 98 specimens. By far the larger number of these specimens are in the collection of the Kansas University Museum. The material, with few exceptions, was made up of small series from widely separated localities. Material from the critical region in Oklahoma was meager, and more specimens, particularly large series from a few localities, will determine beyond peradventure the status of *obtusirostris* and *septentrionalis,* which are here treated as subspecies of the same species.

The maximum size of the subspecies as shown by material studied is about 75 millimeters, four specimens reaching this size. Newly hatched young are 25 to 26 millimeters in length.

The number of scales from parietals to above anus varies from 57 to 62, 60 being more than twice as frequent as any other number. The variation in scale rows about the middle of the body is rather considerable, varying as they do from 24 to 29, the usual numbers being 26, 27, or 28, the last appearing the greatest number of times. The northern specimens from Iowa, Minnesota, and Wisconsin have a lower number on the average, 26 being the most usual number. Four of the northern specimens have 25, while in three, the count is 24. The number of upper labials is 7, uniform in all save six specimens, of which there are five having two labials fused on one side of the head. No specimen showed a larger number.

The number of nuchals is usually one pair, but in 18 specimens (out of 86) an extra nuchal is present on one side; in 14 two complete pairs are present; in one three pairs, and in one all of the nuchals are broken, resembling body scales. The supraoculars are invariably four, three usually contacting the frontal, but in eight cases, on one side only, two are in contact, while in three cases there are only two on each side. Three specimens only have a single postmental. The postnasal is absent in all cases, but in 12 specimens the anterior loreal is broken transversely, leaving an extra scale simulating a very large postnasal. The frontonasal is normally small, surrounded by the supranasal and the prefrontals. In four cases, however, the scale is in contact with the anterior loreal. In 19 cases the scale is in contact with the rostral; in 18 cases it is fused with either the right or left prefrontal or equally fused to the two prefrontals and apparently absent. The superciliaries are six,

seven, or eight, seven being the normal number for Kansas specimens, with eight rarely, while in the Minnesota and Wisconsin specimens seven is most frequent, with six appearing occasionally.

The number of lamellae on the fourth toe varies from 12 to 17. In seventy specimens, counting both sides, the following numbers appeared: 12, four times; 13, twenty-four times; 14, sixty-one times; 15, thirty-one times; 16, eleven times; and 17, three times.

The limbs when adpressed on the sides of the body fail to touch in specimens over 50 mm. snout to vent measurement; while under this size they usually touch or overlap, and in newly hatched specimens may overlap 4 millimeters. In general, the temporals are as described, the primary moderately large, forming a definite suture with the lower secondary. In two cases only are there exceptions which allow the seventh labial to form a definite suture with the upper secondary temporal. There are usually two postlabials. The postsuboculars are three or four (about equally), rarely five.

In large adults the tail is 1.5 times head-body length; snout to forelimb in head-body length, 3.3 times; foreleg into head-body length, 4.54; hind leg into head-body length, 3.59 times; axilla to groin in head-body length, 1.61 times (average male and female). (Females have a longer axilla to groin measurement than males.)

In younger specimens the proportions are quite different. In newly hatched young the proportions are as follows: the tail, 1.17 times head-body length; the snout to forelimb in head-body length, 2.4; foreleg into head-body length, 3.67 times; hind leg into head-body length, 2.85 times; the axilla to groin in head-body length, 2.14 times. From these comparative figures it will be observed that the limbs are proportionally longer in the young than in the older specimens, a condition that obtains in all species I have examined.

The head length always exceeds the width, even in the oldest males. The head never assumes the strongly inflated condition found in males of the *Fasciatus* group.

Color variation. The variation in color and markings in *Eumeces septentrionalis septentrionalis* is not great save that the brown pigment forming dorsal stripes may be sparse, so that instead of lines the stripes of the ground color may be bordered by dots or merely a line of deeper olive color. The median line usually shows as a lighter (sometimes approaching white) line, a difference that is evident in some newly hatched young. The brown stripes likewise vary in width and in consequence the lighter, ground color lines are somewhat narrower.

In the young the dark stripes occupy more area than the lighter ground color and the markings on the head are moderately distinct. These lighter marks are of about the same color intensity as the median dorsal line and are arranged somewhat concentrically in the parietal region.

Occasionally the general olive ground color of the back tends toward a light brown; occasionally toward a somewhat greenish coloration. The tails of the young are blue and this color may be retained until the third year. Occasional older specimens may show some bluish reflections.

Remarks. Males during the breeding season develop a deep reddish-orange coloration on the edges of the lower jaw and the sides of the head in the temporal region. This soon tends to fade out and no trace of this color is left in specimens collected a month later.

Specimens collected in May deposited eggs, while in captivity, during the latter part of the month. The burrows were made in soft earth under flat rocks. The clutches numbered from five to eight eggs. These were removed and placed in boxes of moist earth. Those completely buried failed to develop, while those with a portion of the shell left above the surface of the earth under a rock, hatched. Unfortunately, complete data on dates of laying and hatching, while kept, have since been lost.

The similarity of this form with *multivirgatus* is often a bit puzzling. The two forms, owing to the fact that the ground color is broken up by the darker brown streaks on the back, appear to have a larger series of light lines on the back than normal for the genus. However, the pigmentation (or lack of it) of the secondary lines is of a different quality from the typical dorsolateral and lateral lines as may be noted in young specimens and older ones preserved in formalin. In *multivirgatus,* too, there is a tendency for a dark area on the head to divide the lighter color on the head, resulting in a marking suggestive of the bifurcating lines found in the *Fasciatus* and *Brevilineatus* groups. In fact, it may be the connecting link between these two patterns.

In the young of *septentrionalis* the three dorsal lines of the ground color are dimly in evidence at hatching and there is a series of light marks, scattered in a more or less definite pattern on the parietal region of the head, but in no way suggesting the bifurcating lines of the other mentioned groups. The typical dorsolateral and lateral light lines are strongly marked.

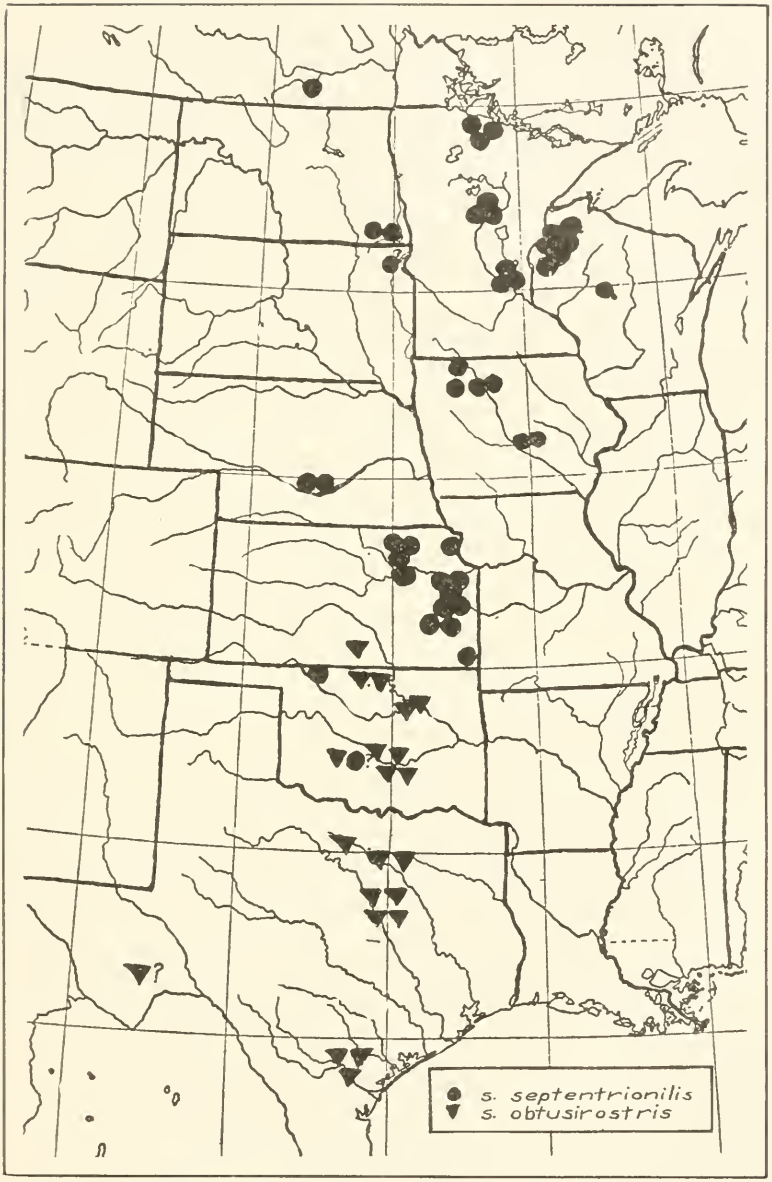

FIG. 67. Distribution of *Eumeces septentrionalis septentrionalis* (Baird) and *E. s. obtusirostris* (Bocourt), in Central United States.

Distribution. The locality records show the presence of *septentrionalis septentrionalis* in Canada, North Dakota, South Dakota, Minnesota, Wisconsin, Iowa, Nebraska, Kansas and Oklahoma. However, perhaps throughout the greater part of the latter state some of the characters are present that distinguish the subspecies *obtusirostris*. I have examined a single Kansas specimen that had the typical *obtusirostris* frontoparietal.

Locality records:

KANSAS:

Pottawatomie Co.: Five miles north of Onaga (Field 5) (U.S.N.M. 3) (Mich. 2) (M.C.Z. 2) (A.M.N.H. 6) (Ottawa U. 1); St. Marys (M.C.Z. 1) (E.H.T. 14).

Woodson Co.: Neosho Falls (K.U. 2) (U.S.N.M. 1).

Wabaunsee Co.: Maplehill (U.S.N.M. 3).

Anderson Co.: Near Glenlock (U.S.N.M. 1); Fish creek near Glenlock (K.U. 2).

Douglas Co.: Near Lawrence (K.U. 1); 10 miles west of Lawrence (K.U. 2); 5 miles west of Lawrence (K.U. 3).

Franklin Co.: 8 miles east Ottawa (E.H.T. 1).

Atchison Co.: Atchison (Mich. U. 1).

Cherokee Co.: (Burt, 1928; no definite locality).

MINNESOTA:

Chisago Co.: Rush City Bridge (Pub. Mus. Milwaukee 1).

Crow Wing Co.: Brainard (Toledo Z.S. 3); Fort Ripley (U.S.N.M. 3, cotypes; Dr. Head Coll.).

Sherburne Co.: Elk River (U.S.N.M. 4).

Beltrami Co.: Bemidji (K.U. 4).

Unidentified localities: Elk Head Minn. (A.M.N.H. 2); ?Red River of the North (U.S.N.M. 2).

WISCONSIN:

Burnett Co.: Randall (Pub. Mus. Milwaukee 2, Graenicher, 1911); mouth of the Yellow river (Pub. Mus. Milwaukee 3, Graenicher, 1911) (Field 15).

Polk Co.: Nevers Dam (Pub. Mus. Milwaukee 1, Graenicher, 1911).

Clark Co.: Chippewa Falls, Worden township (Schmidt, 1926).

Washburn Co.: (H. V. Ogden Coll. 2); (as far north as Lake Winnebago, Hoy.).

NEBRASKA:

Buffalo Co.: 2 mi. south Kearney (A.M.N.H. 2) (U.S.N.M. 1, Fort Kearney).

Unidentified locality: Sand Hills, Neb. (Cope, 1900).

IOWA:

Dickinson Co.: Lake Okoboji (M.C.Z. 1).

Palo Alto Co.: (Mich. U. 1); 3 mi. west of Ruthven (Mich. U. 1).

Clay Co.: 2 mi. SE Greenville (Mich. U. 1); Milford (Mich. U. 1).

Polk Co.: Des Moines (U.S.N.M. 1).

Oklahoma:
?Tulsa Co.: (Force, 1930).
Woods Co.: Near Alva (K.U. 1).
?Caddo Co.: Old Fort Cobb (Cope, 1900; U.S.N.M. 1).

North Dakota: *Richland Co.:* Lidgerwood (U.S.N.M. 1); Wahpeton (U.S.N.M. 1).

South Dakota: *?Roberts Co.:* Eastern part of the state as far north as Roberts Co. (Over, 1923).

Canada: *Manitoba:* Onah, 20 mi. east of Brandon (Patch, 1934, 1).

Eumeces septentrionalis obtusirostris (Bocourt)

(Plate 28, Figs. 1, 2; Fig. 67)

SYNONYMY

1879. *Eumeces obtusirostris* Bocourt. Mission Sci. Mexique, Liv. 6, 1879, p. 423, pl. 22 D, fig. 1, 1a, 1b, (type description in key; type locality, Texas), and Liv. 7, 1881, pp. 441-443.

1880. *Eumeces pachyurus* Cope. Bull. U. S. Nat. Mus., No. 17, 1880, pp. 19, 20, 39 (type locality, near Dallas, Texas; Mr. Boll, collector; compared with *septentrionalis*, specimens of which are erroneously listed from Savannah, Ga.); Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 377; Cope, Ann. Rept. U. S. Nat. Mus., 1898 (1900); p. 659; Brown, Proc. Acad. Nat. Sci. Phil., 1913, p. 553; Strecker, Baylor Univ. Bull., XII, No. 1. Jan., 1909, pp. 11-15 (reports *Eumeces tetragrammus* from Paisano, Brewster Co., Texas; this specimen, now 58337 U.S.N.M., is a specimen of *E. s. obtusirostris*); Strecker, Proc. Biol. Soc. Wash., XXIII, 1910, pp. 118, 119, pl. II, fig. 2 (photo of two specimens) (Waco, Texas; detailed descriptions of two specimens); Ditmars, The Reptile Book, 1915, p. 20; Stejneger and Barbour, Check List N. Amer. Amph. Rept., 1923, pp. 76, 77; Ortenburger, Uni. Okla. Bull., Proc. Okla. Acad. Sci., pt. 1, VI, p. 95 (Caddo and Cleveland counties, Okla.); Strecker, Copeia, No. 162, Jan.-Mar., 1927, p. 9; Stejneger and Barbour. Check List N. Amer. Amph. Rept., 3d Ed., 1933, p. 82.

1887. *Eumeces tetragrammus* Boulenger (part.). Cat. Liz. Brit. Mus., III, 1887, pp. 375, 376.

1917. *Plestiodon pachyurus* Stejneger and Barbour. Check List N. Amer. Amph. Rept., 1917, p. 70.

History. This form was first recognized by Bocourt, in 1879, who published the name *Eumeces obtusirostris* with key characters and figures of the same, in livraison 6, Mission Scientifique au Mexique et Dans l'Amerique Centrale. The complete description, however, appeared in livraison 7, in 1881. It would appear that the earlier date of 1879 must be recognized since that is the date of the first publication, and the name *obtusirostris* must take precedence over *pachyurus* of Cope. The description as given in the key is brief, but the figures are excellent and unmistakable. The type is a specimen which Bocourt received from Prof. W. Peters; the type locality is Texas. The type is presumably in the Natural History Museum of Paris.

Cope, in 1880 (Bull. U.S.N.M. No. 17), described as new *Eumeces pachyurus*. The type locality of his species is near Dallas, Tex., the type having been collected by Mr. Boll and presented to Cope. On a comparison of the description it appears indisputable that

they refer to the same species and that the older name must be retained.

Boulenger, without having carefully examined the description and figures of the types, has placed *Eumeces obtusirostris* in the synonymy of *Eumeces tetragrammus,* and Cope (1900) has followed Boulenger's disposition of the species.

While I have not examined the type, it is quite obvious from a study of the description and figures that the form cannot be *tetragrammus.* My conclusions are based on the following facts:

1. Two postmental plates; one in *tetragrammus* usually.
2. A grayish median line; none in *tetragrammus.*
3. Dorsolateral line bordered above with darker; not true in *tetragrammus.*
4. Head with darker dots; not present in *tetragrammus.*
5. The lateral white line passes above the ear; passes through the ear in *tetragrammus.*
6. Head without curving lines; present in *tetragrammus.*

The descriptions and figures do agree with the type of Cope's *Eumeces pachyurus* and the two must be considered synonyms.

Boulenger (1887), in his catalogue, recognizes Cope's *pachyurus,* but he had no specimens available. Save for the type no new specimens were known until Strecker (1909) obtained a specimen in Brewster Co., Texas, which he called *Eumeces tetragrammus.* This specimen, now 58337 U.S.N.M., is an *obtusirostris,* typical save that the frontonasal is slightly smaller than normal and fails to touch the first loreal. It is quite certainly not *tetragrammus.*

Strecker (1910) recognizes specimens collected near Waco, Tex., as belonging to Copes' *E. pachyurus,* and gives descriptions of an adult and a young specimen. He compares the forms with *tetragrammus,* but he had no specimens of the closely related *septentrionalis* at hand for comparison.

Ortenburger (1926) lists the species from Caddo and Cleveland counties, Oklahoma.

As has already been pointed out by Cope (1880), the form is related to *septentrionalis.* However, the characters used to separate *pachyurus* from *septentrionalis* are not as stable as Cope supposed, particularly as regards the number of scale rows about the middle of the body. It appears that the characters of the southern form are usually more stable than those of the northern form. The necessity of combining *obtusirostris* and *septentrionalis* as subspecies under a single species becomes obvious when series of these forms are compared.

In *obtusirostris* the white lateral lines originate on the posterior supraocular region; a dim median line is often present; in many specimens four brown lines are evident on the back. The legs are usually a little longer in *septentrionalis* and in consequence their separation when adpressed is less than in *obtusirostris*. In this character there does not appear to be an abrupt change. Unfortunately in Oklahoma, which is the critical region between *obtusirostris* and *septentrionalis*, only few specimens have been available. Those from Cleveland county agree with the characters laid down for *obtusirostris*, while in a brood of four from Kay county, Oklahoma, two show the frontonasal as in *septentrionalis* and two as in *obtusirostris*.

Whether the total population shows such intergradation of these characters may be doubted and larger collections must be obtained before the distributional limits of the two forms can be determined. A single southern Kansas specimen shows the typical characters of *obtusirostris*, while all others examined, chiefly from the northern part of the state, are *septentrionalis*.

Diagnosis. Similar to *Eumeces septentrionalis septentrionalis*, but with the frontonasal larger and in contact with the anterior loreal; limbs averaging somewhat shorter; with a tendency to lose the dim median lighter stripe and the brown dorsal lines, save those bordering the dorsolateral light lines.

Description of the species. Since the two subspecies are so closely related, I shall make the description of *obtusirostris* chiefly a comparison with *s. septentrionalis*, using Texas specimens from near Waco and San Antonio, Tex.

The part of the rostral visible above usually smaller and the angle more obtuse. The supranasals are of the same size or slightly larger, always in contact, preventing the rostral from touching the frontonasal (latter scales frequently in contact in northern specimens of *s. septentrionalis*). The frontoparietal is always wider than long, and only in two cases (one, Benton, Atascosa county, and one from Brewster county) do the frontonasals fail to touch the anterior loreals. The frontal and associated supraoculars are similar in the two forms (the frontal touching the frontonasal in about 50 percent of the specimens [rarely touching in *septentrionalis*]); frontoparietals are larger than the prefrontals (of equal size or smaller usually in *s. septentrionalis*). One or rarely two pairs of nuchals; the interparietal always in contact with the nuchals; seven labials, the last largest, their character as in *septentrionalis*. The first loreal is rarely

transversely segmented (in two specimens a small fragment is segmented, leaving a tiny postmental on one side); the nasal is apparently not completely divided; the anterior loreal always higher than the posterior. The scales in a row from the occiput to above anus, from 55 to 58, the average being 57 (the usual number in *s. septentrionalis* being 60). The scales about the neck average two less. On the body the number of scale rows is 28; the type of *pachyurus* and one other has 26 rows.

The limbs average a little shorter than those of *s. septentrionalis* where specimens of equal snout to vent measurement are considered, and the number of lamellae under the fourth toe averages only one less.

Color. The color characters are very similar. A dorsolateral line originates on the last supraocular and follows the middle of the fourth row of scales to tail. In *s. septentrionalis* the origin is the same, but in practically all cases the line follows the outer edge of the fourth row and the inner edge of the fifth for the greater part of the body length. The median secondary line is dim even in young and usually does not reach nuchals; it is bordered by very dim darker lines (usually very distinct in *s. septentrionalis*). The dorsolateral light line is bordered above by a dark line usually much narrower than in *s. septentrionalis;* the course of the light lateral line is the same with relation to the ear in both forms. Specimens from Waco are olive, showing the same shades of color

Measurements of *Eumeces septentrionalis obtusirostris* (Bocourt)

Museum..... Number..... Sex.....	A.N.S.P. 13545	K.U. 7801 ♂	K.U. 13159 ♂	K.U. 15562 ♀	K.U. 7745 ♂	K.U. 12744 ♀	K.U. 13158 yg.	K.U. 8892 yg.
Snout to vent.....	74	66	63	62	55	55	45	32
Tail.....	78	108	.....	.....	.....	.....	73	.....
Snout to eye.....	.....	4	4.2	4	3.5	3.2	3	2.3
Snout to ear.....	.....	10.3	11.2	10.3	10	9.2	8.2	6
Snout to foreleg....	22	20.2	20.3	18	17.5	17.2	15.2	11.7
Axilla to groin.....	.....	36	37	37	32.5	32.5	26	15.5
Width of head...	9	8	10	8.5	7.3	7.3	7	5
Length of head..	10.2	9	10.2	9.2	8.1	8.3	7.8	6
Foreleg.....	14	12	14	13	11	11.2	11	8
Hind leg.....	18	17.5	18.2	17	15.7	15.4	14	9
Longest toe.....	7.5	5.4	6	5.7	5.4	5.5	5	3.8

No. 13545, type, Dallas, Texas; 7801, 13159, 13158, Waco, McLennan Co., Texas; 7745, 12744, Atascosa Co., Texas; 15562, Bexar Co., Texas; 8892, central Texas.

as *s. septentrionalis,* while those about San Antonio are usually brownish above. In young specimens the tip of the snout is cream color. The median line is always more distinct in females than in males.

Variation. Most of the variable characters have been discussed in the foregoing description.

Remarks. This species, like its neighbor, *Eumeces brevilineatus,* frequents the vicinity of the large masses of *Opuntia* so common in southern Texas, and usually takes refuge in the sand about their bases, from which places they may be captured only with considerable difficulty. Near Waco, Tex., I captured several specimens from debris about the bases of willow trees in gravel pits. Here they were feeding in company with *Leiolopisma.* In this same locality and association were collected more than one hundred specimens of the small snake *Potamophis striatulus* (Linné).

While collecting amphibians at night about a small pond near Somerset, Tex., two were discovered and captured. They were first observed on a small stump in the edge of the water, and when disturbed took to the water to escape, diving below its surface. It suggests that they may be somewhat nocturnal in habit. To the west of Waco, along the Brazos river, two specimens were taken from leaves and other debris at the base of a large tree.

Distribution. The extent of the range of this subspecies cannot be fixed with certainty. It appears to have an east-west range in Texas, from Houston to Alpine. The characters on which the two subspecies are founded seem to intermingle and many of the Oklahoma records (and one from Kansas) are of specimens more or less transitional between the two forms. (See Fig. 67 for distributional map.)

Locality records:

OKLAHOMA:

Cleveland Co.: (Okla. U. 2).
Tulsa Co.: (Okla. U. 1) (Mich. U. 5).
Kay Co.: (Okla. U. 4).
Okmulgee Co.: (Okla. U. 2).
Garvin Co.: (Okla. U. 5).
Seminole Co.: (Okla. U. 1).
Caddo Co.: Old Fort Cobb (U.S.N.M. 1).

TEXAS:

Atascosa Co.: Near Somerset (K.U. 2) (E.H.T. 1); near Lytle (Baylor 3).
McLennan Co.: 3 mi. NW Waco in gravel pits (K.U. 8) (Baylor 2); Waco (Baylor 3) (Field 1) (U.S.N.M. 1) (Strecker, 1910, 2); 7 mi.

west Waco (Baylor 1); Flood's farm near Waco (Baylor 1); Traver's Farm (Baylor 1); Tonkaway Creek (Baylor 1).

Palopinto Co.: Near Mineral Wells (K.U. 1).

Brewster Co.: Near Paisano (U.S.N.M. 1).

Dallas Co.: Near Dallas (A.N.S.P. 1, type); Dallas (Baylor 2).

KANSAS: *Kingman Co.:* Near Norwich (K.U. 1); (this specimen approaches this subspecies more closely than the typical *s. septentrionalis,* and is associated with this subspecies).

SKILTONIANUS GROUP

In the *Skiltonianus* group I include several forms occurring in the western part of North America, characterized by the presence (at least in the young) of typical dorsolateral and lateral light lines, the former pair always separated by less than four scale rows. No median light line present or lines on the head. Postnasal normally present; two postmentals. Subcaudals much widened. Tails in young blue or red; scale bordering postgenial on median side elongate; upper labials seven or eight; lateral postanal scale more or less differentiated in males.

The relationship of this group is with the Mexican *Brevirostris* group primarily, from which it differs in but few characters. *E. lagunensis* appears to be the annectant form. The group next closely related is probably the *Quadrilineatus* group in southeastern Asia.

In examining the western skinks classified in American collections under the name *Eumeces skiltonianus*, it becomes apparent that the extraordinary differences evidenced by the material cannot be explained by considering them as variants of a single species. Not only are there marked differences in the evolution of color patterns in certain populations, but there are also different growth patterns, as well as marked differences in maximum size. Unfortunately these color and growth differences are not accompanied by any striking or constant scale differences, and all the specimens examined seem to fit into a single form when the usual key characters alone (Cope's, 1900) are considered.

In the genus *Eumeces* one cannot always depend on the usual key character of head scales to distinguish species; and often two wholly unrelated species may bear a striking resemblance if scales alone are considered. In such cases characters other than the presence or absence of postnasals, a single or divided postmental, the number of labials, supraoculars and superciliaries must be considered; the color markings and growth characters must also be given definite

consideration. Often the variation of the usual key characters within a species is such as to permit it to fit the characters of more than one form. Hence the great unreliability of most keys in determining the identity and validity of a species. Often, too, the descriptions published are so meager as to prevent a species from being recognized.

I am fully convinced that the evolutionary factors that make for the permanent changes in a color pattern, and that permanently change rate and amount of growth, are quite as significant as one that unites two scales such as a nasal and postnasal; that divides a postmental into two scales; or allows an intercalated axillary scale row to extend farther on the sides of the body, thus increasing the number of scale rows about the body. Often forms designated as color varieties may be far more worthy of the name species than presumed species founded on a scale variant which may be anomalous.

That more than a single specific entity is involved in the *skiltonianus* complex has been recognized by various authors, and names have been proposed for most of the recognizable forms.

History of the described forms. The first notice I have seen of any member of this group in scientific literature appears in a paper by Avery J. Skilton in the American Journal of Sciences and Arts (Silliman's Journal), vol. VII, May, 1849, where the author mentions: "Also several skinks resembling *S. quinquelineatus* were caught by the Indians for the missionaries, with hair snares. They dreaded them, declaring they were poisonous." These specimens were sent by Rev. George Gary, superintendent of the Methodist Missions, to Skilton, who in turn forwarded them to the National Museum, where Spencer Baird and Charles Girard as coauthors described them under the name *Plestiodon skiltonianum* in two publications which appeared practically at the same time.

There is some question as to which description of *skiltonianus*, that of Baird and Girard in Proc. Acad. Nat. Sci. Phila., VI, 1852-1853, p. 69 (April, 1852, proceedings), or that of Baird and Girard in Exploration and Survey of the Valley of the Great Salt Lake of Utah by Howard Stansbury, 1852, Philadelphia, should be regarded as the type description. It is obvious that the former description was prepared to precede the latter, since the statement in the paper (p. 68) states: "Full descriptions and figures of these species will shortly appear in Captain Stansbury's Report to Congress on the Great Salt Lake (Utah)." I have not been able to ascertain the

exact date of publication of either of these publications. In the Proc. Acad. Nat. Sci. Phila., VI, 1852-1853, p. 124, appears a communication, dated August 3, in which Prof. S. F. Baird claims priority for a species published in Stansbury's report—"as this report was published early in June [1852] and earlier than the Proceedings (for May and June)." Vol. VI, No. 1, Proc. Acad. Nat. Sci. Phila., was received in the Smithsonian Institution, Washington, before April 14, 1852 (see same publication, p. 71).* Vol. VI, No. 2, was received by the American Philosophical Society before June 21, 1852. The May and June number (No. 3?) was published before August 3.

Thus it will be seen that certainty as to which of the two publications was first published apparently cannot be accurately ascertained unless more accurate data is unearthed than is here produced. At any rate, not more than a very few days can have intervened, and it is quite likely that the April "Proceedings" actually antedated the Stansbury report. Since no question of authorship is involved, the question is academic.

There are two cotypes now in the National Museum, both still in fair condition, save that in the larger of the two the scales have slipped in several places. I designate the smaller specimen as the lectotype of the species.

In 1854 Edward Hallowell described a specimen under the name of *Eumeces sp.* This specimen came from southern California, "Near Mojave river, and in San Bernardino valley." Later, Hallowell (1859) describes this same specimen as *Eumeces quadrilineatus*, and figures the form. This type is present in the National Museum, but is in such a poor state that absolute identification is impossible. However, the description is such as to make practically certain that it is a typical *skiltonianus*.

Later collections have extended the range throughout California, Oregon and Washington. Boulenger (1887) reported the species from Vancouver Island; Van Denburgh (1905) reported the species on the Coronados Islands, which are situated on the coast of Baja California; Ruthven and Gaige (1915), from northeastern Nevada; Van Denburgh (1915), from Utah; and Van Denburgh and Slevin (1921), from Idaho.

In 1879 Bocourt described as new a species, *Eumeces hallowelli*, characterized by a single postmental and 24 rows of scales about the body. The type is a young specimen from California and ap-

* Mr. L. M. Klauber in letter states: "Volume 6, No. 2, of the Proceedings of the Philadelphia Academy was acknowledged by the Smithsonian Institution on June 9, 1852."

pears, from the careful description, to be an anomalous specimen of *skiltonianus*. Specimens having 24 scale rows occur occasionally throughout its range. The undivided postmental is, however, of rare occurrence. Unfortunately, no definite type locality is known.

Van Denburgh, in 1895, described a species, *Eumeces lagunensis*, from Baja California from two specimens collected in the Sierra de La Laguna in the southern part of the peninsula. This description, while brief, is accompanied by a carefully drawn figure, showing well the differential characters of the species. The types were afterwards destroyed in the fire of 1906. In 1896 Van Denburgh described another species from the Yosemite in the Sierra Nevada of California. This was named *Eumeces gilberti*, having been collected by Dr. Charles H. Gilbert and James M. Hyde the same year. The description is discrete and a series of measurements is given of the paratypes. The type and paratypes of this species are still in existence in Sanford University. I have not seen the type but I have examined several paratypes collected at the same locality by the same collectors.

Cope (1900) described two varieties of *skiltonianus*. One was based upon a specimen from Fort Humboldt, which was given the name *amblygrammus*. The character used to separate the form from the typical *skiltonianus* was the fact that the body was deep black and the dorsolateral stripes were much wider—"occupies the adjacent two-thirds of the second and third rows of scales from middle of back and is half as wide as the black dorsal interspace." The type of this form could not be found in the collection of the U. S. National Museum in 1933.

The second form mentioned by Cope is var. *brevipes*, based on a large female specimen, the body greatly distended with eggs. The limbs are proportionally shorter than in typical *skiltonianus*, and there is but a single postmental. I have been able to examine the type of this form, and regard it as belonging to a subspecies differing from *skiltonianus*.

The subsequent fate of these various species names concerns us. Baird (1859) makes *quadrilineatus* a synonym of *skiltonianus* and it has been so accepted by subsequent writers save Hallowell, who in 1859 or '60 reported the species from Astoria, Columbia river.

Eumeces hallowelli Bocourt was placed in the synonymy of *E. skiltonianus* by Stejneger (1893) and has so been regarded by writers since that time.

Eumeces lagunensis was first questioned by R. B. McLain (1899),

who states: "It is not improbable that Mr. Van Denburgh's species has abnormal head shields, and is simply a synonym of *E. skiltonianus.*" *Eumeces gilberti* Van Denburgh was recognized at first by Grinnell and certain other authors. However, Camp (1916) concludes that there is only a single species in California and considers *gilberti* a synonym of *skiltonianus.* He has been followed in this opinion by most subsequent writers on this form.

Grinnell and Camp (1917) formally place the above forms, together with Cope's *brevipes* and *amblygrammus,* in the synonymy of *skiltonianus.* Nelson (1921) recognized *lagunensis* as a subspecies of *E. skiltonianus.* Stejneger and Barbour (1923) recognized *E. lagunensis* as a full species. Loveridge (1930) again places the species back in the synonymy, only to be resurrected by Linsdale (1932) as a subspecies of *skiltonianus.* The fact that such variable and changeable opinion has obtained regarding the western skinks is proof that the problem of their identity is not simple by any means.

I have examined most of the preserved specimens of these western forms in the museums of the United States. My conclusions which are here expressed are tentative. They represent my solution of certain of the problems; but due to lack of material, I leave certain problems unsolved to my own satisfaction. These, it seems, must await the accumulation of more material from critical territory, and a study of the vertical distribution of the various forms.

Thus, I have associated with *Eumeces skiltonianus,* as a subspecies, a group of specimens from Eldorado county which differ from the typical and which agree with Cope's *skiltonianus brevipes;* with *gilberti,* two forms which, save for lack of adequate material and the possibility of their being aberrant specimens, would be regarded as distinct forms.

The nominal species *amblygrammus,* owing to the fact that the type appears to be lost and that no material is available which I can unhesitatingly associate under this name, is placed in the synonymy of *skiltonianus.*

I wish to express my heartiest thanks to Dr. Joseph Grinnell, who has made available the large *Eumeces* collection of the Museum of Vertebrate Zoölogy, University of California, and has read this part of the manuscript and offered numerous and valuable suggestions; to Dr. Jean Linsdale and Mr. Fitch of this institution, who have likewise read this section, offered many helpful suggestions and checked spelling of geographical names; to Mr. L. M.

Klauber and Mr. Joseph Slevin, who have made available large collections, either privately owned or under their charge. They likewise have read the manuscript on the *Skiltonianus* group and have offered suggestions.

KEY TO THE SPECIES OF THE SKILTONIANUS GROUP

PAGE

A. The seventh labial broadly in contact with the upper secondary temporal; parietals enclose interparietal; tail uniform red or salmon colored in young; primary temporal small; seven upper labials; limbs, adpressed, fail to touch by a short distance; juvenile markings (exeept those of tail) retained in adults. Scale rows usually 24; 60 mm. max. size. (Baja California) ..... *Eumeces lagunensis* Van Denburgh, 431

AA. The seventh labial not in contact with the upper secondary temporal; interparietal enclosed or not; tail red or blue in young. Primary temporal large; limbs variable.

B. Young with red tails and four light lines. Adults uniform olive; size large—101 mm. max.; 24–26 scale rows, usually 24. (Lower central half of California and upper Baja California) ..... *Eumeces gilberti rubricaudatus* subsp. nov., 446

BB. Young with blue tails and four light lines.

C. Smaller, max. size about 75 mm.

D. General character of the markings of young retained in adult male and female save the blue of tail is lost. Scale rows 24–28, usually 26. Parietals enclose parietal only in southern part of California—not in other part of range. Two pairs of nuchals; 7 or 8 upper labials. 59 scales snout to above anus. The dorsolateral line usually occupies only about one half or less of the second scale row, leaving light dorsolateral lines separated usually by two whole and two one-half scale rows. (West of Rocky Mts.)

Eumeces skiltonianus skiltonianus (Baird and Girard), 415

DD. Larger, maximum size 85–90 mm. Similar to the above subspecies but head longer, axilla to groin distance longer and the limbs proportionally shorter. Scales more glazed in appearance. Tail lavender. Eldorado Co., Cal., and north along the Sierra, and south to (?) Fresno Co. ..... *Eumeces skiltonianus brevipes* Cope, 428

CC. Larger, maximum size above 113 mm.; the juvenile coloration lost about third or fourth year by both males and females. The dorsolateral light line usually occupying more than half of second scale row. Usually eight upper labials. (California east of the San Joaquin Valley.)

Eumeces gilberti gilberti Van Denburgh, 438

Eumeces skiltonianus skiltonianus (Baird and Girard)

(Plates 35 and 36, Figs. 2, 3, 4; Fig. 68)

SYNONYMY

1849. [———] Skilton. Amer. Jour. Sci. Arts (Silliman's Journal), VII, May, 1849 (mentions several skinks resembling *S. quinquelineatus* [types]).

1852. *Plestiodon skiltonianum* Baird and Girard. Proc. Acad. Nat. Sci. Phila., 1852, p. 69 (type description; type locality, Oregon; collected by Rev. George Geary [or Gary]); Baird and Girard, in Stansbury's Expl. Surv. Val. Great Salt Lake, Inc. Recon. Route Rocky Mts., 1853, Rept., App. C, pp. 349-354, pl. IV, figs. 4, 5, 6 (redescription); Baird, Expl. Surv. R. R. Route Pac., Zoöl., Rept., X, No. 3, 1857, p. 18 (Fort Humboldt); Baird, Expl. Surv. R. R. Route Pac., Zoöl., Rept. (Williamson and Abbot), X, pt. 4, 1859, p. 9, pl. IX, fig. 3; Garman, Bull. Essex Inst., XVI, Jan. 9, 1884, p. 15 (*Eumeces*); Grinnell and Camp, Univ. Cal. Publ. Zoöl., XVII, No. 10, 1917, pp. 175, 176; Stejneger and Barbour, Check List N. Amer. Amph. Rept., 1917, p. 71; Cowles, Journ. Ent. and Zoöl., XII, No. 3, 1920, p. 66; Stephens, Trans. San Diego Soc. Nat. Hist., III, No. 4, 1921, p. 63 (San Diego Co., Calif.); Van Denburgh and Slevin, Proc. Calif. Acad. Sci., (4), XI, No. 3, July 8, 1921, pp. 40, 44, 52 (Idaho); *idem*, No. 3, 1921, p. 28 (Nevada); Van Denburgh, Occas. Papers Calif.

Acad. Sci., X, Vol. 1, Nov. 23, 1922, pp. 578-587 (part.); Schmidt, Bull. Amer. Mus. Nat. Hist., XLVI, Art. 11, p. 682 (also mentioned pp. 612, 613, 617, 620, 621, 622, 628, 630) (part.); Pratt, Vert. Anim. U. S., 1923, p. 207; Erwin, Eleventh Bien. Rept. Board Trustees State Hist. Soc. Idaho, 1927-1928 (1928), p. 32 (Idaho); Woodbury, Copeia, No. 166, Mar. 23, 1928, p. 19.

1854. *Eumeces* sp. Hallowell. Proc. Acad. Nat. Sci. Phila., 1854, p. 95 (near Mojave River and in San Bernardino Valley, southern California "Lower California").

1859. *Eumeces quadrilineatus* Hallowell, Expl. Surv. R. R. Route to Pac., 1853, pt. IV, Zoöl. Rept., 1859 (Williamson), p. 10, pl. IX, figs. 3a, b, c, d (type description; type locality near "Mojave River, and in San Bernardino Valley, southern part of upper California"); Heerman, Expl. Surv. R. R. Pac., 1853, pt. IV, Zoöl. Rept., 1859, p. 24; Hallowell, Trans. Amer. Phil. Soc., XI, pp. 73, 74.

1875. *Eumeces skiltonianus* Cope. Bull. U. S. Nat. Mus., No. 1, 1875, p. 45; Yarrow and Henshaw, in Wheeler's Ann. Rept. Chief Eng. Geog. Surv. Terr. U. S. west 100th Mer. etc., Appendix NN, 1878, p. 218; Bocourt, Miss. Sci. Mex., Rept., 6th Livr., 1879, p. 433, pls. XXIIA, fig. 3, and XXIIIA, fig. 3; Yarrow, Bull. U. S. Nat. Mus., No. 24, 1883, p. 41; Cope, Proc. Acad. Nat. Sci. Phila., 1883, p. 32; Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 373; Townsend, Proc. U. S. Nat. Mus., X, 1887, p. 238; Stejneger, N. Amer. Fauna, No. 7, 1893, p. 201 (part.); Van Denburgh, Occas. Papers Calif. Acad. Sci., V, 1897, p. 144, fig.; McLain, Contr. N. Amer. Herp., 1899, p. 10 (regards *E. lagunensis* a synonym of this species); Cope, Ann. Rept. U. S. Nat. Mus., 1898 (1900), pp. 460-464, fig. 126 (part.) (good discussion, detailed description); Van Denburgh, Proc. Calif. Acad. Sci., (3), IV, No. 1, p. 18 (N. Coronados I, Mex.); Ditmars, Rept. Book, 1907, p. 198, pl. LVII, fig. (part.); Grinnell and Grinnell, Throop Inst. Bull., No. XXXV, Mar., 1907, pp. 35-37 (Los Angeles Co.); Van Denburgh, Proc. Calif. Acad. Sci., (4), III, Jan. 17, 1912, pp. 147, 149, 151; Hurter, First Ann. Rept. Laguna Marine Lab., 1912, p. 67; Atsatt, Univ. Calif. Publ. Zoöl., XII, No. 3, Nov. 20, 1913, pp. 40, 41, 46, 48 (part.); Van Denburgh and Slevin, Proc. Calif. Acad. Sci., (4), IV, Dec. 30, 1914, pp. 133, 138, 140, 141 (Catalina Island, North and East Coronados Islands); Ditmars, Rept. Book, 1915, p. 198; Ruthven and Gaige, Occas. Papers Mus. Zoöl. Univ. Mich., No. 8, Apr. 25, 1915, pp. 26-28; Van Denburgh and Slevin, Proc. Calif. Acad. Sci., (4), V, No. 4, 1915, pp. 105-106 (Utah); Camp, Univ. Calif. Publ. Zoöl., XVII, No. 7, 1916, pp. 72, 86 (note on color); Grinnell and Camp, Univ. Calif. Publ. Zoöl., XVII, No. 10, July 11, 1917, pp. 175, 176 (locality records); Stejneger and Barbour, Check List N. Amer. Amph. Rept., 2d Ed., 1923, p. 77; Tanner, Copeia, No. 163, Apr.-June, 1927, p. 56 (Utah); Bogert, Bull. South. Calif. Acad. Sci., XXIX, Jan.-Apr., 1930, pt. 1, pp. 3-14; Klauber, Bull. 5, Zoöl. Soc. San Diego, Mar. 12, 1930, p. 4; Woodbury, Bull. Univ. Utah, XXI, Feb., 1931, fig. 20 (Biol. Surv., Vol. 1, No. 4) (Utah) (part.); Stejneger and Barbour, Check List N. Amer. Amph. Rept., 3d Ed., 1933, p. 83; Svihla and Svihla, Copeia, No. 3, Oct. 15, 1933, pp. 125-127 (Washington).

1879 *Eumeces hallowelli* Bocourt. Miss. Sci. Mex., Rept., 6th Livr., 1879, p. 435, pl. XXIIE, fig. 7 (type description; type locality, California); Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 373.

?1898. *Eumeces skiltonianus* var. *amblygrammus* Cope. Ann. Rept. U. S. Nat. Mus., 1898 (1900), p. 643 (type locality, Fort Humboldt).

Diagnosis. Characterized by four longitudinal white lines, the dorsolateral originating on the first superciliary and continuing back on the tail for some distance, following the second and third scale rows, not or rarely occupying more than one half of the second row; lateral line beginning on the anterior labials, usually the third or fourth, passing back toward upper half of ear, not involving upper edge, then continuing along the sides to the tail; tail in young blue, in adults, colored like body; the dorsolateral and lateral stripes not obliterated in old specimens; scale rows normally 26, 24 occurring more or less frequently, while 28 occurs

rarely; seven or eight upper labials; two postmentals; one postnasal; parietals separated or in contact; normally two pairs of nuchals; maximum size not exceeding 90 millimeters; upper secondary temporal normally separated from the seventh or eighth labials; prefrontals either separated or forming a median suture; tail in cross section usually somewhat subquadrangular; adpressed limbs usually overlap in males and fail to overlap in females (rarely in old males); adult males lacking a distinctive red head, but occasionally showing some reddish during breeding seasons.

Description of the species. Portion of the rostral appearing above distinctly less than a half the size of the frontonasal; supranasals large, their length not quite one and one half times their depth, in contact medially; frontonasal large, much broader than long, in contact laterally with the anterior loreals, in contact (or not) with the frontal; prefrontals moderate, in contact or not medially, the suture with frontonasal and frontal about equal; frontal typical, its length about a fourth greater than its distance from the tip of the snout, touching three supraoculars; frontoparietals subrectangular in shape, forming a median suture less than half their length; interparietal relatively narrow, elongate, not enclosed by the parietals (often enclosed); parietals large, followed by two pairs of nuchals, the anterior much the larger; nasal small, not wholly divided by a suture, the part anterior to the nostril much larger than the part posterior; a single postnasal; anterior loreal much higher than wide, higher than the posterior; latter short, often as high as long, but normally a little longer than high; four supraoculars, the anterior forming a broad suture with the prefrontal, occasionally excluding the first superciliary from contact with this scale; seven superciliaries, usually the last much smaller than the first; two presuboculars, three or four postsuboculars; the median upper palpebral scales in contact with the superciliaries; a small preocular, followed by two or three granular scales; two small postoculars, the lower the larger; primary temporal moderately small, quadrangular; upper secondary large, slightly widened posteriorly; lower secondary generally triangular, often somewhat emarginate, often extending farther back than the seventh labial, in contact in front with the primary; tertiary temporal not much enlarged, bordering the upper secondary, separated from the ear by one or two scales; labials seven or eight, four or five preceding the subocular, the first usually no larger than succeeding scales; subocular nearly as high as its labial border; last labial largest

(seventh or eighth), separated from the ear by a pair of postlabials or by a large postlabial followed by a pair of scales (rarely two pairs of postlabials).

Normally six lower labials; mental with a labial border much longer than that of rostral; postmental divided (very rarely not); three typical chinshields; a large postgenial, bordered usually by a scale longer than wide (occasionally this scale fused with the postgenial, the scale then bordering the latter usually wider than long).

Scales on the lower eyelid enlarged, separated from the subocular by about two rows of granular scales; ear opening moderate, with two or three lobules of unequal size. Body scales in parallel rows on the sides; median dorsal rows usually distinctly wider than the adjacent rows and likewise larger than the lateral or ventral scales; scale rows around neck immediately behind ear, 33; about constricted portion of neck, 27; in axillary region, 31; about middle of body, 26; about base of tail, 17; scales under tail much widened, about 104 scales in the series; six preanal scales, the median much enlarged, the outer scales overlapping the inner; a distinctly enlarged postanal scute in males, frequently forming a slight mound-like projection; females with a more or less definite constriction at the base of the tail; latter subquadrangular in cross section, at least through the proximal half, better defined in some specimens than in others.

About 14 scales around the insertion of arm; outer wrist tubercle well defined; palm with several scattered larger tubercles; lamellar formula for fingers: 5; 9; 11; 11; 8. About 19 scales around the insertion of the leg; usually four enlarged heel pads, the two median usually not in contact; a few larger pads on the sole, usually forming a diagonal line from the base of the first digit across to the base of the fourth; lamellar formula for toes: 6; 9; 12, 14; 9. Terminal lamellae not tightly bound about claws; a small area of granular scales in axilla, none behind insertion of hind leg.

The pits on the scales of the side of neck and body are distinct in young, dim or obsolete in old specimens. The usual number is two, usually placed close together, or somewhat wider apart on the larger, more-dorsal rows. There may be three or four pits on scales behind ear and in the posthumeral, postfemoral and axillary regions.

Coloration of young. Above blackish, with a bluish or bluish-white dorsolateral line on or near the rostral, passing along the edges of the head and body on the outer half of the second scale

row and the inner half or third of the third scale row, to a short distance on the tail, where it becomes lost. The lateral light line begins on the labials (varying from the second to the subocular labial), passes to ear and borders the anterior side; on the posterior edge of the ear only the lower half is bordered. Thence it passes back along the side of the body, usually on the sixth or sixth and seventh scale rows, to a distance on the tail usually a little greater than the dorsolateral line. The color between the two light lines is more intense than on the back. There is a narrow dark line below the lateral light line. The tail varies from ultramarine to cobalt blue above and on the sides. The chin and throat are usually flesh or cream, the abdomen bluish-gray to gray, and the underside of the tail frequently lavender with a median light line indicated. The under sides of the limbs and the anal region are cream.

Adult coloration. The juvenile coloration tends to become lighter, the dorsal ground color becoming lighter, usually gray-olive or brown-olive, leaving a black or deep brown line bordering the dorsolateral line above. The dorsal scales may show some dark edges or flecks. The lateral stripe between the two light lines becomes deep brown, either uniform or, in southern forms, with gray flecks or a threadlike line of flecks. The tail now is greenish-gray and later becomes the same shade as the dorsal surface. The dorsolateral lines remain distinct, often, however, having only a slightly lighter shade of olive or brown than the ground color; the lateral line is usually lighter, often remaining more or less cream color. The head in older specimens becomes brownish and at the breeding season shows a reddish tinge on the sides of the head. The head never loses the darker pigment nor becomes a uniform reddish as in *gilberti*. The dark line bordering the dorsolateral line above becomes frequently broken into a series of dots. The light line below the tail is retained and is usually fairly well defined.

Variation. Eumeces skiltonianus in various parts of its range exhibits numerous variations from the typical, some of which might warrant recognition of subspecies were they constant. In certain cases it would appear that these may have been brought about by isolation, but since this isolation no longer exists, the populations have been allowed to mingle, and the characters which had become fixed are being broken down. This is suggested in the case of specimens with a reduction of the interparietal and its consequent separation from the nuchals by the junction of the parietals, and those with the interparietal in contact with the nuchals.

Table of measurements of *Eumeces skiltonianus skiltonianus* (Baird and Girard)

Museum Number** Sex	S.U. 6 ♀	C.A.S. 41674 ♀	S.U. 8 ♀	S.U. 2026 ♂	S.U. 3755 ♂	S.U. 7165 ♂	S.U. 1111 ♀	S.U. 3417 ♀	S.U. 7171 ♂	S.U. 11 ♂	S.U. 7173 yg.	S.U. 3776 yg.	S.U. 3425 yg.
Snout to vent	72	72	68	65	63	60	60	58	58	55	49	42	31
Tail	.....	122*	132	.....	.....	.....	.....	105	106	.....	.....	.....	.....
Snout to eye	5.2	5	5	5	5	4.8	4.2	4.3	4.3	4	4	3.5	2.6
Snout to foreleg	21.5	22	21.5	22	21	20.5	20	18.5	19.5	18	17	14	12
Axilla to groin	41	42	39	35	33	32	34	31	29	30	26	22	15.5
Width of head	10.2	10.5	9	11	9.5	10	8	8	9	8	8	6.3	5
Length of head	12	12	11.5	12.5	12	11.8	11	10	11	10	10	8	6.8
Postanal width	9.5	9.2	9	8.8	8	7	7.2	6.3	6.2	6	6	5	3
Foreleg	17	17	17.5	17	15.5	14.5	15	17.5	16	14	13	10.3	9
Hind leg	25	24.5	24	24	21	22	21	19.5	23	19	19	16.3	11.2
Longest toe	9	9.2	9	8.8	9	7	8	8	8	7.5	7.3	6.2	4.6

* Regenerated.

** Numbers 41674, 3755, 3776, 7173, 3425, 11, 1111, are from the vicinity of Stanford University; 3417, Wright's; 6, Mt. Hamilton; 8, Mountain View; 2026, Smith Creek; 7171, 7165, Jasper Ridge; all from Santa Clara Co.

A very limited number of specimens has been examined from the northern part of the range in British Columbia, Washington and Oregon. From no locality of this region have I had more than two or three specimens. Those that were available displayed much variation among themselves. Most of the northern specimens seem to show more of a light area on the snout where the dorsolaterals join. Some of the individual peculiarities observed are as follows:

A.M.N.H. No. 28654, West Branch Kootenay river, is young, measuring 26 mm. snout to vent. The body is brownish and white, the tail faintly blue. The colors appear to have faded. A small scale on each side of the frontonasal separates the latter from the anterior loreal. The temporals are typical. A second specimen, U.S.N.M. No. 6282, Washington Fork, Lower Kootenay river, has no characters to distinguish it from typical specimens in California. Both have the labials 7-7.

Two Washington specimens are peculiar in having the primary temporal fused with the upper secondary temporal, leaving the seventh labial broadly in contact with the upper temporal. A specimen from "Fort Klamath, Des Chutes river," Oregon, has the seventh labial forming a suture with the upper secondary temporal, while the primary temporal is present, but small. I am doubtful that this character is as common in the northern specimens as the small series I have seen might indicate. This relation of the seventh labial to the upper secondary temporal is extremely rare in California specimens; two such were observed in some three hundred specimens. Nevertheless this is the normal condition which obtains in *E. lagunensis*, as well as in certain other species related to *skiltonianus* occurring in Mexico.

The northern forms have 24 or 26 scale rows, the latter occurring only rarely; the upper labials are 7-7. The largest specimen is 81 mm. and is regarded as one of the types. Moreover, it is larger than any typical specimen seen. In the northern part of California (including Siskyou and Tehama counties) a series of 22 specimens were examined. These do not differ greatly in color from more northern specimens. The males and females differ in the length of limbs, the females having a greater axilla to groin length and slightly shorter limbs, which in adult specimens fail to overlap, when adpressed, by two to four millimeters. In males of the same snout to vent measurement, the adpressed limbs overlap two to four millimeters. The maximum size observed in the 22 specimens is 66 mm. The scales in a row from the parietals to a point above the vent

average about 59. The upper labials are usually eight, 13 having eight upper labials, five having that number on one side and seven on the other, while four have seven on each side (eight occurring in about 70 percent of the cases). In 12 the prefrontals are in contact, in 10 they are separated. The temporals show no peculiarities. In none is the interparietal enclosed. Twenty-six scale rows about the body is the typical number. The heads of males are not particularly widened and there are no peculiarities of markings that would identify their locality.

From the group of counties to the south of the above-mentioned, including Mendocino, Lake, Sonoma, Napa, Solano and Marin, I have examined in detail some 40 specimens. These are quite like those from the northern counties save for proportions, or variations in certain scale characters. Thus, the number of specimens having the eight labials is reduced to about 30 percent of the cases. The relative length of limbs in proportion to the axilla to groin length is the same as in the counties to the north. The scale rows about the middle of the body is 26 in about 96 percent of the cases. In no specimens are the parietals in contact, inclosing the interparietal. The maximum size is 72 millimeters.

In the group of counties west of the San Joaquin valley to the south of San Francisco Bay, extending south to Los Angeles county, more than a hundred specimens were examined. In this region the presence of eight upper labials is very rare, occurring in only about 4 percent of the specimens and these from the extreme northern part of the region under consideration. The interparietal is enclosed by the parietals in about 10 percent of the cases, the condition being encountered most frequently in specimens in the southern part of the range. The number of scale rows is normally 26, although 24 occurs in a small percent of the specimens and an occasional one shows 27 or 28. In some localities practically all have the prefrontals separated, while in others most of the specimens have theirs forming a median suture, the average being about 50 percent each way. The maximum size of specimens in this region is 72 millimeters.

In the region about Carmel, in Monterey county, as well as farther south, a few specimens were noted having shorter, broader heads than typical (note illustration). Some of these are much browner in color than is typical (Pl. 36, fig. 3).

South of the San Bernardino mountains the species appears to be of somewhat smaller maximum size. The largest specimens are about 67 millimeters in length (snout to vent) and in the southern

part of San Diego county and the northern part of Baja California most specimens have the median scale rows no wider than the adjoining rows. From north to south there is a continual increase in the proportion of specimens having the parietals enclosing the interparietal. The percentage in San Diego Co. reaches as high as 70 percent, while in northern Baja California the average is 80 percent. On Todos Santos the average is 100 percent. In this region the number of scale rows is lower, 24 occurring about as frequently as 26. There is less difference in the proportional length of the legs in males and females. The coloration is typical; the tails in the young are blue.

An excellent series of specimens from the Coronados Island group is present in the California Academy of Sciences. These are quite similar in detail to those occurring along the coast about Los Angeles, the maximum size reaching 72 mm. Here, in 11 specimens out of 35, eight labials are present on one or both sides, the actual percentage (counting both sides) being 24 percent. There are only seven specimens which do not have the parietals enclosing the interparietal. The nuchals are more frequently 2-2. In many northern specimens the formula might be 2-1 or 1-1, although 2-2 is common. In 15 percent of the specimens the nuchals are 3-3. The prefrontals are in contact in all but 9 specimens, and where separated the separation is very minute. In coloration there is but little difference between these and typical mainland specimens. It is noticeable that there is a line of small lighter flecks in the upper edge of the brown lateral stripe, a character evident in some specimens on the mainland. The larger number of specimens have 26 scale rows, the others 24 rows.

The specimens from Todos Santos Island differ more from the mainland forms than those of the Coronados Islands (see Pl. 36, fig. 2). In general the scale characters are the same save that there is a separation of the first superciliary from the prefrontal in about half of the specimens. These specimens are less olive and more brown in color than is typical.

In many of the southern specimens, on islands as well as on the mainland, there is a tendency for the seventh labial (last) to be somewhat smaller, while the lower secondary temporal extends farther back; that is, beyond a vertical line drawn from the back edge of the last labial.

Specimens from Idaho, Utah and eastern Nevada differ in no striking characteristics from central California specimens. The

limbs appear to be slightly longer in these females than in those from California, since in practically all specimens (two exceptions) examined the adpressed limbs touch or overlap. The labials are usually 8-8 or 8-7; only three out of seventeen have the number 7-7. The oldest and largest specimens examined showed the dorsolateral and lateral lines clearly defined. The dorsal ground color is olive-gray or olive-brown with a trace of a dark line bounding the dorsolateral light line. There may be a row of darker flecks near the middle of the median scale rows. The median scale rows are widened normally. These specimens have the dorsal scales very slightly rugose. I have not noticed this in California specimens. The brown lateral stripe is very distinct in the oldest specimens, and the light line under the tail is evident in all. Scale rows are 24 or 26, the numbers occurring about equally. Dorsal scales in a row from parietals to above vent average about 60. In the young specimens the tails are blue and the dorsolateral and lateral lines are almost of the same shade of blue as the tail. This is likewise true of certain California specimens. Nuchals are 2-2 usually, the prefrontals usually touch, and the parietal is never enclosed.

In the Museum of Comparative Zoölogy at Harvard is a specimen (No. 4727) which purports to have been collected in Colorado. I feel that this locality should be questioned. The specimen apparently was killed by being run over by an auto, and apparently was dried when found. There is no assurance that the specimen originated in Colorado even though it was collected there. In all characters it agrees with the normal Utah specimens. It is, of course, not improbable that the species extends into Colorado.

Remarks. The supposed types of *Eumeces skiltonianus*, now in the United States National Museum, are in good condition (1933), but in the larger of the two the scales are missing in many places. The larger specimen has a snout to vent measurement of 83 mm., which is larger than the typical specimens from California, in fact larger than any other specimen seen of typical *skiltonianus*. It raises a question as to whether this is actually one of the types, and if so, whether it really originated in Oregon. The catalogue card suggests California as its locality. I therefore propose to designate the smaller of the presumed two types as the lectotype, since there is an element of doubt that the larger specimen originated in Oregon and that it was one of the original types.

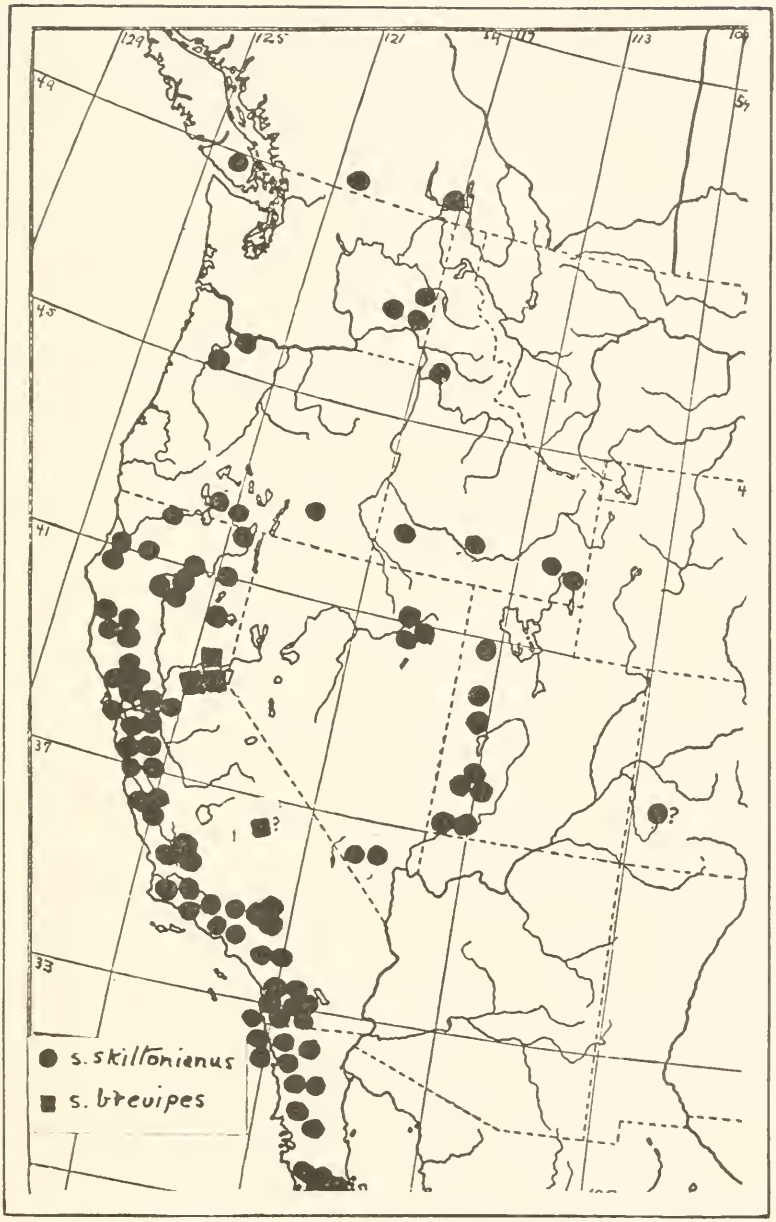

FIG. 68. Distribution of *Eumeces skiltonianus skiltonianus* (Baird and Girard), and *Eumeces skiltonianus brevipes* (Cope), in Western United States.

Locality records:

BRITISH COLUMBIA:

West Branch Kootenay river (A.M.N.H. 1); Vaseux Lake south of Penticton (Patch, 1934, 1); Vancouver I. (Brit. Mus. 2).

NEVADA:

Elko Co.: Carlin Cortez Range (Mich. U. 4) (M.C.Z. 2).

Clark Co.: Charleston Park (S.D.S.N.H. 2).

COLORADO: (M.C.Z. 1). (I regard this as very doubtful. See note elsewhere.)

IDAHO:

Ada Co.: Boise (C.A.S. 1).

Bannock Co.: Pocatello (K.U. 1).

Bingham Co.: Fort Hall (C.A.S. 1).

Nez Perce Co.: Lewiston (C.A.S. 1).

Tooele Co.: Foothills east of Fischer's Pass, 3½ miles west of Clover (Knowlton and Janes, 1934, 1).

UTAH:

Beaver Co.: (U.S.N.M. 2); Beaver (C.A.S. 4); Wild Cat Cañon (C.A.S. 1).

Juab Co.: Levan (C.A.S. 1).

Millard Co.: Fillmore (Mich. U. 1).

Washington Co.: (A.M.N.H. 3) (M.C.Z. 1).

OREGON:

Harvey Co.: Diamond (U.S.N.M. 1).

Klamath Co.: Deschutes river (U.S.N.M. 1); ? between Ashland and Klamath Falls (U.S.N.M. 1).

Marion Co.: Salem (U.S.N.M. 2).

Multnomah Co.: Ardenwald near Sellwood (L.M.K. 1).

Localities not allocated to counties: Willamette Valley (A.N.S.P. 2); Columbia river (A.N.S.P. 3).

WASHINGTON:

Adams Co.: Swamphake (Cornell 2).

Spokane Co.: Cheney (Cal. U. 3); Spokane (Cal. U. 1).

Whitman Co.: Pullman (A.M.N.H. 1) (Cornell 1); Wawawei (A.M.N.H. 1) (M.C.Z. 1).

Unidentified: Clark's Ford, Lower Kootenay River (A.M.N.H. 1).

CALIFORNIA:

Siskiyou Co.: Fort Jones (Stanford U. 1).

Modoc Co.: Fort Bidwell (U.S.N.M. 1).

Humboldt Co.: Near Harris (Cornell 1); Fortuna (M.C.Z. 1).

Trinity Co.: Yollo Bolly Mt., 4,000 ft. (Cal. U. 1).

Shasta Co.: Anderson (Stanford 1); Pit river (Van Denburgh, 1922); Baird (Van Denburgh, 1922).

Lassen Co.: Pit river (Stanford 1).

Tehama Co.: Manton, 3,000 ft. (Cal. U. 1); Red Bluff, 350 ft. (Cal. U. 1); Turner's Lyonsville, 3,500 ft. (Cal. U. 18).

*? Plumas Co.:** Near Keddie (Cal. U. 1).

Mendocino Co.: Covelo (Cal. U. 1) (C.A.S. 1); south of Covelo (Cal. U. 1); Ukiah (U.S.N.M. 1); Lake Leonhard, 10 mi. NW Ukiah (Cal.

* I have questioned the above locality.

U. 1); west of Summit of Sanhedrin (4,500 ft.) (Cal. U. 1); Comptche (A.M.N.H. 1) (C.A.S. 17).

Lake Co.: Lakeport (Cal. U. 2); Kelseyville (Stanford 1).

Sonoma Co.: Camp Meeker (C.A.S. 4); West Cazadero (Cal. U. 2); Sonoma (Cornell 1); Skaggs Springs (C.A.S. 9); Petaluma (M.C.Z. 7); Eldridge (C.A.S. 1); Cloverdale (Van Denburgh, 1922); Healdsburg (Van Denburgh, 1922).

Napa Co.: Calistoga (Cal. U. 1) (U.S.N.M. 4) (M.C.Z. 2); near Napa, 200 ft. (Cal. U. 3); Suscol (U.S.N.M. 1); St. Helena (A.N.S.P. 3).

Marin Co.: (U.S.N.M. 4); Cañon near Fairfax (Cal. U. 1); San Anselmo, 300 ft. (Cal. U. 1); Fairfax (Cal. U. 1); Larkspur (Stanford 1); Lagunitas (U.S.N.M. 1) (C.A.S. 2); Mill Valley (C.A.S. 1); San Rafael (C.A.S. 2); Point Reyes (Van Denburgh, 1922); Phoenix Gulch (Van Denburgh, 1922); Rock Springs (C.A.S. 1).

Solano Co.: Near Vacaville (Cal. U. 2); Ware Island (U.S.N.M. 1).

Contra Costa Co.: Redwood Cañon (Cal. U. 1); Pinole (Cal. U. 1); Grizzly Peak (Cal. U. 5); Wild Cat Cañon (Cal. U. 1).

Alameda Co.: Berkeley (Cal. U. 1) (Cornell 1) (U.S.N.M. 1) (C.A.S. 1); Clarement Cañon near Berkeley (Cal. U. 1); South Oakland (Cornell 1); Oakland (U.S.N.M. 1); Hayward (U.S.N.M. 1); Oakland Hills (C.A.S. 2); Leona Heights (C.A.S. 1).

San Mateo Co.: Pescadero (Stanford 1); Summit above Searsville (Stanford 1); San Mateo (M.C.Z. 2).

Santa Clara Co.: (U.S.N.M. 2); College Park (Stanford 1); Stanford University (U.S.N.M. 3) (C.A.S. 3); Palo Alto (M.C.Z. 21) (Stanford 19) (Mich. 2); Jasper Ridge (Stanford 7); near Black Mountain (Stanford 1); Alum Rock Cañon (Stanford 1); Wright's (Stanford 1); Rucker's Moss Valley (Stanford 1); Mount Hamilton (Stanford 1); Smith Creek, Mt. Hamilton (Stanford 1); Rucker's, Uvas Valley (Stanford 1); Milpitas (U.S.N.M. 1); San Jose (A.N.S.P. 3) (M.C.Z. 2); Los Gatos (Van Denburgh, 1922).

Santa Cruz Co.: Santa Cruz (U.S.N.M. 5); Covey's Cove west of Ben Lommond (Cal. U. 1); Corralitos (Stanford 1); Big Basin, Santa Cruz Mts. (Stanford 2); Boulder Creek (Stanford 1).

Monterey Co.: Monterey (U.S.N.M. 1) (C.A.S. 1); Soledad (A.N.S.P. 1); Pacific Grove (M.C.Z. 5) (C.A.S. 1); Carmel (C.A.S. 13); San Benito (A.M.N.H. 1); Jamesburg (C.A.S. 1).

San Luis Obispo Co.: La Panza (Cal. U. 1).

Santa Barbara Co.: Santa Barbara (E.H.T. 1) (A.N.S.P. 1) (M.C.Z. 1).

Ventura Co.: Nordhoff (Cal. U. 3).

Orange Co.: (U.S.N.M. 1); Laguna Beach (Van Denburgh, 1922).

San Bernardino Co.: Fish Creek, San Bernardino Mts. (Cal. U. 3); Fork Santa Ana, 6,200 ft., San Bernardino Mts. (Cal. U. 2); San Bernardino Mts. (Stanford 1) (U.S.N.M. 1).

Los Angeles Co.: (U.S.N.M. 3) (A.N.S.P. 7) (C.A.S. 1); Arroyo Seco near Pasadena (Cal. U. 1); foothills near Pasadena (Cal. U. 1); Bailey Cañon, Sierra Madre (Cal. U. 2); San Gabriel Mts., 6,000 ft. (Cal. U. 2) (A.M.N.H. 1); Sierra Madre, 2,500 ft. (Cal. U. 1); Corral Cañon, Santa Monica Mts. (Cal. U. 1); Claremont (Cornell 1); Los Angeles (A.M.N.H. 1); Boquet Cañon, 45 miles from Los

Angeles (U.S.N.M. 1); Placenta Cañon (U.S.N.M. 1); Avalon, Catalina Island (C.A.S. 1); La Crescenta (C.A.S. 1); San Pedro (Van Denburgh, 1922); Fish Cañon (Van Denburgh, 1922).

Riverside Co.: First Mill Site, San Jacinto Mts., 5,300 ft. (Cal. U. 1); Strawberry Valley, 5,500 ft., Jacinto Mts. (Cal. U. 1); Palm Springs (Cal. U. 1) (Stanford 1); Idyllwild (S.D.S.N.H. 3) (A.M.N.H. 1); San Jacinto (Stanford 1); Banning (U.S.N.M. 3); North of Cabezon (U.S.N.M. 1).

San Diego Co.: (A.M.N.H. 1) (K.U. 1) (L.M.K. 2) (Field 1); Chula Vista (Cal. U. 1); Balboa Park (Cal. U. 1) (S.D.S.N.H. 1); Point Loma (S.D.S.N.H. 1) (L.M.K. 1); San Diego (C.A.S. 3) (U.S.N.M. 2) (A.N.S.P. 1) (M.C.Z. 2) (S.D.S.N.H. 2); Camp Kearney (S.D.S.N.H. 1); Laguna Mts. (S.D.S.N.H. 9) (L.M.K. 4) (A.M.N.H. 1); Monument 258 (S.D.S.N.H. 2); Deerhorn Flat (S.D.S.N.H. 2); Torrey Pines (S.D.S.N.H. 1); Alvarado Cañon (S.D.S.N.H. 1); Viejas Valley (L.M.K. 1); Pine Hills (L.M.K. 1); Alpine (L.M.K. 1) (K.U. 1); Julian (L.M.K. 1); Lakeside (L.M.K. 1); Doane Valley, Palomar Mt. (L.M.K. 2); Palomar Mt. (K.U. 5); Jamul (Indian Spring) (L.M.K. 1); Cuyamaca Mt. (L.M.K. 3); Pauma (L.M.K. 1); La Mesa (L.M.K. 1); Dulzura (Stanford 1); Fallbrook (Cornell 1); Mussey (K.U. 1); Twin Oaks (U.S.N.M. 1); near Escondido (Van Denburgh, 1922); Witch Creek (C.A.S. 1); Poway (Van Denburgh, 1922).

*Tulare Co.:** Kaweah (C.A.S. 1); Monache Meadows Sierra Nevada (Cal. U. 1); ? Traver (U.S.N.M. 1).

Baja California, Mexico:†

Coronados Is. (M.C.Z. 6) (C.A.S. 6); South Coronados (Cal. U. 1) (S.D.S.N.H. 2) (L.M.K. 2) (C.A.S. 17); East Coronados (A.M.N.H. 1) (C.A.S. 9); North Coronados (A.M.N.H. 1) (C.A.S. 2); Todos Santos Islands (Cal. U. 3) (C.A.S. 7); San Quentin (C.A.S. 1); Enseñada (C.A.S. 2); Alcatraz, San Pedro Martir Mts. (C.A.S. 1); Arroyo Encantado (C.A.S. 2); San Jose, 2,500 ft., Lat. 31° (C.A.S. 4) (Cal. U. 1); La Grulla, 7,500 ft., San Pedro Martir Mts. (Cal. U. 1); Rosarita Divide (Field 1); San Pedro Martir Mts. (U.S.N.M. 1); Aqua Caliente (C.A.S. 3).

Eumeces skiltonianus brevipes (Cope)

(Fig. 68)

SYNONYMY

1900. *Eumeces skiltonianus* var. *brevipes* Cope. Ann. Rept. U. S. Nat. Mus., 1898 (1900), pp. 643, 644 (type locality, Fresno, Cal.; G. Eisen, collector; type No. 12558 U.S.N.M., in good condition).

1922. *Eumeces skiltonianus* (part.) Van Denburgh. Occ. Papers Cal. Acad. Sci., X, Vol. I, pp. 579-583 (Eldorado Co. specimens).

History. The type, together with certain *Eumeces* which appear to belong to the form here recognized as *Eumeces gilberti rubri-*

* I have questioned the above localities. There is some doubt either about the identification or the locality.

† Guerrero, Mexico (Acapulco). A specimen in Harvard Museum of Comparative Zoölogy purports to be from the above locality. I regard this specimen as having originated in California, even though acquired in Acapulco. The specimen has had the tip of the lower jaw pierced, suggesting that it may have been held on a leash when alive.

caudatus, were collected at Fresno by Gustav Eisen. Cope recognized the form under the name *brevipes*, stating that "Additional specimens are necessary to determine the question of the rank of this form." The specimen has an undivided postmental, and this, I suspect, is an anomalous condition. This name has invariably been referred to the synonymy of *skiltonianus*.

Diagnosis. Related to *skiltonianus skiltonianus*, but larger and more robust, the body proportionally more elongate, the scales having a more glassy appearance. The tail is lavender, a color retained more or less in the adults.

Description of the type. (Type No. 12558, U.S.N.M., G. Eisen, collector.) From Cope (1900).

"In a large and probably old specimen (Cat. No. 12558) there is but one mental plate, and the limbs are conspicuously shorter than in the adult of the typical form. The color is also modified in a way which is different from that seen in other adults. Additional specimens are necessary to determine the question of the rank of this form. It diverges, however, so widely from the normal that I describe it under a distinct name.

"The limbs, adpressed to the sides, do not meet by a space equal to the length of the forearm and hand, which is more than double the space between the limbs in the adults of the typical variety. The hind limb is one-third the length from the groin to the end of the muzzle. The tail is usually robust, but the extremity is lost in the specimen. In coloration the dorsal ten rows of scales are all alike, dark olive, bordered with brown. There is a pale spot on the outer border of the scales of the third row from the median line on each side, which gives the impression of an indistinct narrow pale streak. Belly and posterior gular region blue; chin, throat, a crossband at axillae, and the inferior surfaces of limbs and tail, light yellow. The external border of the broad median row of subcaudal scales (which are twice as wide as those of the adjacent rows) are bordered with plumbeous, forming two narrow streaks. The scales of the upper side of the tail are brown bordered. The dimensions equal those of the largest adults of the usual type."

Scale rows, 26 about middle of body; upper labials, 7-8. Tail especially thick; foot with four large scales which cross the foot diagonally; limbs separated by 10 scales. The specimen is a large female greatly distended with eggs. Except for a greater length of the head and head scales the form resembles the general characters of *skiltonianus skiltonianus*, save those mentioned in the diagnosis. The color has now faded considerably. The dorsolateral lines are still distinct, separated by two whole and a little more than two half rows of scales. The lateral line is not clearly differentiated. The tail, however, shows four dim lighter lines. All the anterior labials white; posterior labials with upper edges dark.

Measurements of El Dorado county specimens referred to *Eumeces skiltonianus brevipes* Cope

Museum Number Sex	S.U. 3645 yg.	S.U. 3648 yg.	S.U. 3647 ♀	S.U. 3640 ♂	S.U. 3639 ♂	S.U. 3641 ♂	S.U. ? ♂	S.U. 3607 ♂
Snout to vent	43	46	60	68	74	77	79	80
Tail	.....	79	.....	.....	123+	.....	123+	142
Snout to foreleg	15	16	18	22	24.2	24.6	26	24
Axilla to groin	23	25	33	38	42	41	44	43
Head length	8.5	9	11	12	10	10	12	12
Head width	6	6	8	9	13	12	14	14
Foreleg	10	11	14	17	19	20	20	19
Hind leg	15	17	20	24	25	26	28	25

No. 3607, Sugar Loaf P.O., 5000 ft., El Dorado Co.; others from Fyffe, El Dorado Co.

Variation. I have associated with *skiltonianus brevipes* a group of specimens in Stanford University, from Eldorado county. The series consists of numbers 3607, 2639-3648. (No. 3420 [89 mm.] purporting to be from Eldorado county [Fyffe] is *Eumeces gilberti gilberti*, quite probably from Yosemite Valley.) In this series the young have the light greenish-white dorsolateral line occupying about three fifths of the second scale row. The dorsal coloration in the youngest (42 mm.) is gray-olive with black lines bordering the dorsolateral light lines. The lateral stripe is deep black-brown. The lateral greenish-white line begins on the rostral, involves all but the upper and lower edges of the ear, and passes to the tail; below this is a narrow dark line. The tails are *lavender* above and on sides; the chin, throat, breast and underside of tail cream; the belly grayish.

This color pattern is largely retained by both males and females until a length of approximately 80 mm. is reached. The lateral stripe, however, is not so dark, and the light lines become more olive but still distinct. One specimen, No. 3607 (80 mm.), shows the dorsolateral lines merging posteriorly into the dorsal coloration so that they are lost on the posterior part of the body.

In general the specimens appear to have a smooth, more *glazed* appearance, are less robust than the *gilberti* forms and apparently do not show the red heads and complete loss of the juvenile markings of that species.

Scale data from these specimens are as follows: upper labials, 7-7 in five specimens, 8-8 in four, 8-7 in two, 8-6 in one; prefrontals

in contact in eight, separated in four; nuchals, 2-2 in eight, 1-1 in three, 1-2 in two; scale rows, 26 four times; 25, twice; 24, seven times; median scale rows widened; none with the parietal enclosed. Limbs in males touch or overlap two or three millimeters; in females they barely touch or are separated by two to five millimeters. The subcaudals are from 109-113; scales from parietals to vent 61 to 63.

Remarks. Inasmuch as Gustav Eisen sent from Fresno specimens of typical *skiltonianus skiltonianus* (which apparently does not occur in this locality at the present time), together with *gilberti rubricaudatus* and the type of the present form, I regard it as quite probable that there may be an error as regards the type locality of the present form, *skiltonianus brevipes*.

Distribution. The specimens which I refer to this form are all from Eldorado county, California. It seems likely that it replaces *gilberti gilberti* in the sierras north of Eldorado county, and that it may possibly also be taken to the south, if the type locality is authentic. The locality records are given in the table of measurements.

Eumeces lagunensis Van Denburgh

(Plate 36, Fig. 1; Figs. 69, 70)

SYNONYMY

1895. *Eumeces lagunensis* Van Denburgh. Proc. Cal. Acad. Sci., (2), V, 1895, pp. 79, 134, 135, pl. XIII (general drawing of entire animal, with details of head and forelimb; type description; type locality, San Francisquito, Sierra de La Laguna, Gustav Eisen Coll.); McLain, Critical Notes, 1899, p. 10 (synonymy of *skiltonianus*); Stejneger and Barbour, Check List N. Amer. Rept., 2d Ed., 1923, p. 75.

1921. *Plestiodon lagunensis* Van Denburgh and Slevin. Proc. Cal. Acad. Sci., (4), XI, 1921, pp. 28, 40, 44, 52; Van Denburgh, Occ. Papers Cal. Acad. Sci., X, Vol. 1, Nov. 23, 1922, pp. 587-589 (detailed description); Schmidt, Bull. Amer. Mus. Nat. Hist., XLVI, Dec. 7, 1922, p. 682 (mentioned as a synonym of *skiltonianus*).

1921. *Plestiodon skiltonianus lagunensis* Nelson. Mem. Nat. Acad. Sci., XVI, 1921, pp. 114, 115.

1930. *Eumeces skiltonianus* Loveridge. Copeia, No. 173, 1930, pp. 111, 112.

1932. *Eumeces skiltonianus lagunensis* Linsdale. Univ. Cal. Publ. in Zoöl., XXXVIII, No. 6, p. 374.

History. Two specimens, collected in Baja California by Gustav Eisen, March 28, 1892, were sent to the California Academy of Sciences and were described under the name *Eumeces lagunensis* by John Van Denburgh in 1895. The specific name refers to the Sierra de La Laguna of Baja California, in which the type locality, San Francisquito, is located.

This description, which is somewhat brief, was supplemented by carefully drawn figure. Unfortunately the most distinctive character

of the form, that of the relationship of the temporals, was omitted from the description, and despite the fact that it is clearly shown by the figures, it seems to have been disregarded by subsequent writers treating of the form. The description states that there are seven labials; the figure (type ?) shows eight.

McLain (1899) expresses the opinion that *lagunensis* is a synonym of *skiltonianus*, on the basis of an orange-tailed specimen of (?) *skiltonianus*.* Schmidt (1922), without having seen a specimen of *lagunensis* but basing his opinion on specimens of *skiltonianus* from Todos Santos Island opposite Enseñada, Baja California, regarded *lagunensis* a synonym of *skiltonianus*.

Loveridge, in 1930, on the basis of certain specimens collected by C. T. Brues on Los Coronados Islands, Baja California, concludes that *skiltonianus* and *lagunensis* are identical. It is apparent that he failed to examine the type figure with regard to squamation of the temporal region. Linsdale (1932), having a specimen of *lagunensis* before him obtained at Comondú, Apr. 9, 1931, by Chester C. Lamb, concluded that the specimen "helps to confirm the opinion expressed by the describer of the species (1922, p. 589) that it should be recognized as distinct." Linsdale believed that, because the differences were small, it should be considered subspecifically.

I have been fortunate in having Linsdale's specimen (U. of C., No. 13760) for study and find it conforms very closely not only to the description, but also to the careful figures given by Van Denburgh published with the type description, save in number of labials —seven instead of eight—and the differences are very striking from the typical *skiltonianus*, particularly as pertains to the significant differences in the temporal region.

In an examination of the *Eumeces* material in the United States National Museum, I find a series of six specimens collected between Loreto and Comondú, Baja California, by Dr. W. M. Mann, and classified as *skiltonianus*. This material is uniform in regard to the peculiar characters of the temporals and agrees likewise with the type figures.

The reddish-orange color of the tail is retained in the California specimen, but has been lost in those in the National Museum. This, of course, is to be expected, since in practically all the species, the color of the tail in juveniles is changed in the adult. So far as I have observed in *skiltonianus* the pink or orange color is never present alone save in regenerated parts of the tail, reports to the

* This specimen, from the Chihuahua Mts., Coolidge Coll., is a young *gilberti rubricaudatus*.

contrary notwithstanding (an orange tail does occur in *gilberti rubricaudatus*).

Unfortunately, the types of *lagunensis* (C.A.S., Nos. 400 and 402) were destroyed in the earthquake and fire in 1906. I designate U.S.N.M., Cat. No. 67398, collected by Dr. W. M. Mann, Feb., 1924, "on the trail between Loreto and Comondú" to serve as a neotype, of which Nos. 67399, 67400, 67401, 67402, and 67403 may be regarded as neoparatypes, since no topotype is available at the moment.

The original type locality is San Francisquito, presumably* the barrio of that name belonging to La Paz, near the southern end of the peninsula.

Diagnosis. A medium-sized member of the *Skiltonianus* group, having a well-defined dorsolateral light line from snout to some distance on tail and a lateral line arising on anterior labials passing through the ear to groin; 24 scale rows about body; four supraoculars, three touching frontal; frontonasal in contact with frontal or not; seven upper labials, four preceding the subocular; parietals enclosing the interparietal; seventh labial broadly in contact with the upper secondary temporal, widely separating the primary from the lower secondary temporal; tertiary temporal present; two postlabials, not superimposed. Tail of young orange, this color disappearing in adults. The light lines on body are retained in adults.

Description (from University of California Museum of Vertebrate Zoölogy, No. 13760; Comondú, 1,000 ft., Baja California, Mexico, Apr. 9, 1931, Chester C. Lamb). Part of rostral, appearing above, small, triangular, less than a third the area of the frontonasal; supranasals moderate in size, forming a median suture, touching postnasal and loreal; frontonasal longer than broad, touching anterior loreals, supranasals, prefrontals, and narrowly in contact with the frontal; prefrontals distinctly smaller than the frontoparietal, forming sutures with the two loreals, first supraoculars, frontonasal and frontal, excluded from first superciliary, and not making a median suture; frontal elongate, much longer than its distance from end of snout, in contact with three supraoculars, not constricted on sides; frontoparietals broadly in contact, not or but slightly smaller than the interparietal; parietals large, broadly in contact behind the interparietal; two pairs of nuchals, the anterior distinctly deeper than posterior.

* There is also a barrio San Francisquito between 29° and 30° north lat.; also a point and a bay of that name about 29° 20′ north lat. Comondú is between 26° and 27° north lat.

Nasal small, divided by sutures from the nostril, the anterior part much larger than the posterior; postnasal large, touching two labials; anterior loreal distinctly higher than wide, higher than posterior; latter short, only a little longer than high; four supraoculars, the first relatively large; seven superciliaries, the first not in contact with the prefrontal, smaller than the last; two presuboculars, the anterior much the largest; four postsuboculars; primary temporal small; upper secondary large, of equal width throughout its length, forming a broad suture with the seventh labial; lower secondary

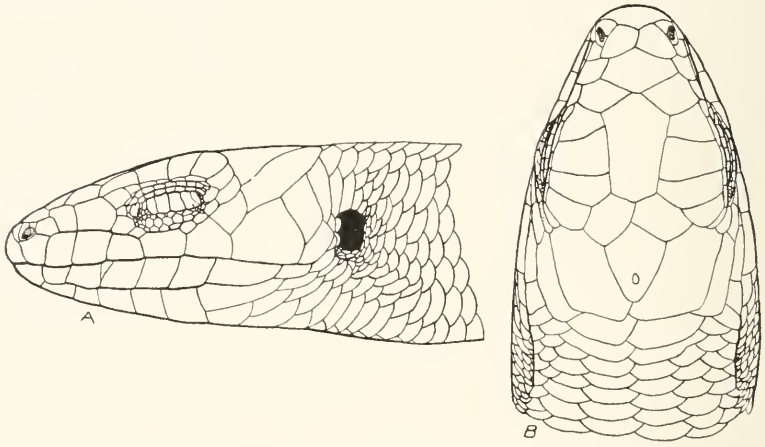

FIG. 69. *Eumeces lagunensis* Van Denburgh. U. of C. No. 13760; Comondú, 1,000 feet, Baja California. A, lateral view of head; B, dorsal view of head. Actual head length, 7.3 mm.; width, 6.5 mm.

rectangular, widely separated from primary; tertiary temporal narrow, elongate, not entering ear.

Seven upper labials, the first neither larger nor higher than the three succeeding; seventh much larger than sixth, followed by a relatively large postlabial, which is separated from the auricular opening by a single small scale.

Eye small, the upper palpebrals in contact with the superciliaries throughout the greater part of the series; lower eyelid with a series of four semitransparent, enlarged scales, separated from the subocular by three rows of granules. A minute preocular, and two small postoculars, of which the lower is largest; ear opening relatively large, with two well-defined lobules; 17 scales surrounding ear. Mental large, with a longer labial border than rostral; two postmentals; three pairs of chinshields, the median largest, the last

followed by an enlarged postgenial and a scale bordering the postgenial which is longer than wide.

Scales on dorsal surface somewhat widened, the four median rows of about equal size, and larger than laterals or ventrals; scale rows about neck behind ear, 28; about narrow part of neck, 27; about body at axilla, 29; about middle of body, 24; about base of tail, 16; scales in a row from parietals to above vent, 58; scales under the tail very broad, 102 scales from vent to tip.

Limbs moderate, failing to touch when adpressed; no small granular scales in axilla, and none following insertion of hind leg; 13 scales about insertion of foreleg; 16 about insertion of hind leg; outer wrist tubercle well developed; palm with three enlarged tubercular scales; lamellar formula for fingers: 5; 7; 10; 10; 7. Heel bordered by four larger scales; sole with one enlarged tubercular scale; lamellar formula for toes: 5; 9; 11; 14; 8. Toes apparently a little more compressed, with the terminal dorsal scale less enlarged than in *skiltonianus*. Vent bordered by six scales, the outer overlapping inner; median pair strongly enlarged.

Pits on scales poorly developed. Scales of the sides of neck and body usually with only a single punctate pit; in the posthumeral and postfemoral regions occasionally two or three pits.

Color (in formalin). Above dark slaty black; a dorsolateral whitish line begins on rostral, continues along side of body to tail where it widens and is lost; the line covers the outer half of second scale rows and inner third of the third, separated from its fellow by two whole and two half scale rows; lateral line begins on second labial, follows the lower edge of the anterior labials, then rises a little, leaving a narrow darker line on the edge, maintaining a straight even course to ear, which it enters about its middle; behind ear it begins on the lower half and continues back to groin on the sixth scale row; chin and breast light; belly lead color; under side and major portion of tail light, dull reddish orange, flecked with darker and with a median darker line; underside of limbs light.

Variation. Seven specimens have been available, measurements of which are given in the following table. The variation in scale rows is as follows: behind ear, 28 to 30; on constricted part of neck, 27 to 29; about axillary region, 29 to 32; about body, 23 to 24, the first number occurring once. Scales in a row from parietals to above vent, 58, 59 or 60, the latter once, the other two, three each; scales about ear, 15 or 16, the latter number the more frequent. Upper and lower labials invariable, as are the supraoculars, post-

Table of measurements of *Eumeces laguncnsis* Van Denburgh

Museum..... Number..... Sex.....	U.S.N.M. 67403 ♂	U. of C. 13760 yg.	U.S.N.M. 67402 ♀	U.S.N.M. 67400 ♂	U.S.N.M. 67399 ♀	U.S.N.M. 67401 ♂	U.S.N.M. 67398 ♀
Total length.*		141					
Snout to vent	39	50	56	57	58.5	59	60
Snout to eye	3.4	4	4.3	4	4	4.3	4.2
Snout to ear	8	9.3	10.4	10.5	9.8	11.3	11
Snout to foreleg	13	18	17.8	19.8	18	20	19.3
Tail		91					
Width of head	6.5	6	6	9	8	9.3	8.2
Length of head	7.3	8.5	8.5	9.2	9.2	9.8	9.3
Width of body	7	8	9.4	10	10	10	12
Postanal width	4.4	6	6	6	7		
Foreleg	9.5	12	13	14	13.7	13.2	13
Hind leg	13	18	18	20	18	20	19
Longest toe	5.2	6	6.1	6	6	6.1	6.6
Axilla to groin	23	27	34.5	33	35	34	35

nasals, postmental, and the character of the enclosed parietal. Four specimens have the frontonasal in contact with the frontal, three separated; lamellae under fourth toe, 14 to 16, the latter occurring once only. Four postsuboculars in all save one specimen.

The limbs overlap in the smallest specimen (two millimeters), touch in those of intermediate size, and are separated a little in the largest specimens. The character and relationship of the temporals are invariable. The single large postlabial seems to be constant.

In the largest specimen the color above is olive-brown, the dorsolateral line complete, greenish-white in color, bordered above by darker color; sides with a dark-brown band, bordered below by the lateral line; latter bordered below by a dark line; belly bluish-green; scales on limbs with grayish centers; tip of regenerated tail purplish. In the youngest specimen the ground color of back is darker. The tail is gray, the regenerated tip light orange.

The specimen described in detail appears to have been preserved in formalin; those in the National Museum have been preserved in alcohol and are generally lighter.

The older specimens have the pitting on the scales somewhat less distinct than in the younger. Many of the scales show two pits. In the postfemoral region the pits are a bit nearer the posterior edge of the scale, and in some cases notch the scale.

Remarks. Aside from the differences in the temporals, this form seems to differ from *skiltonianus* in a slightly lower count of subdigital lamellae, usually two less scale rows around the body, the greater differentiation in size between the sixth and seventh labials, in having the last labial in contact broadly with the upper secondary temporal, and the difference in the character of the axillary scales (not examined in the National Museum series). It also differs in having an orange tail in the young instead of a blue tail. I have seen no young specimen of *skiltonianus* with an orange tail; the newly begun regeneration takes an orange color (the orange tail does occur, however, in *gilberti rubricaudatus*). Also the limbs are somewhat shorter.

Until further evidence to the contrary can be marshalled, this form should be considered as a species distinct from *skiltonianus*. The critical region where this evidence may be found is the northern and central part of Baja California.

Distribution. The form is known only in the southern third of Baja California.

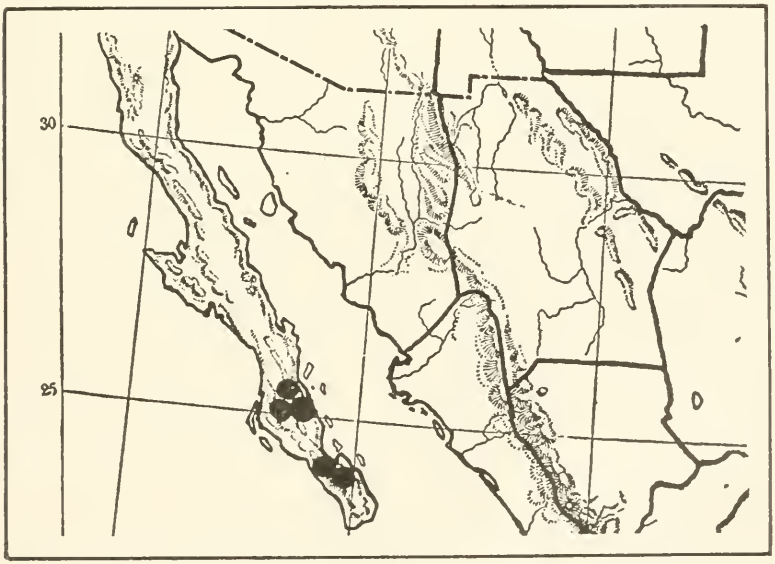

FIG. 70. Distribution of *Eumeces lagunensis* Van Denburgh, in Baja California

Locality records:

BAJA CALIFORNIA: San Francisquito, Sierra de La Laguna (type locality, C.A.S. 2, destroyed); Comondú (U. of C. 1, Lamb Coll.); on trail between Loreto and Comondú (U.S.N.M. 6, Mann Coll.; No. 67398 designated as neotype).

Eumeces gilberti gilberti Van Denburgh

(Plates 37, 38; Figs. 71, 72)

SYNONYMY

1891. *Eumeces skiltonianus* Stejneger. N. Amer. Fauna, No. 7, 1893, pp. 201, 202 (part.); Grinnell and Storer, Hall, Handbook of Yosemite Nat. Park, 1921, p. 179 (part.); Van Denburgh, Occas. Papers Calif. Acad. Sci., X, Vol. 1, 1922, pp. 584-587 (part.) (description; the plate given is of *Eumeces rubricaudatus*); Grinnell and Storer, Anim. Life Yosemite, Univ. Calif. Press, 1924, pp. 633-635 (part.) (descriptions and habits).

1896. *Eumeces gilberti* Van Denburgh. Proc. Calif. Acad. Sci., (2), VI, 1896, pp. 350-352 (type description; type locality, Yosemite Valley, Mariposa county, Calif.); and Occas. Papers Calif. Acad. Sci., V, 1897, pp. 147-149 (part.) (redescription with additional locality records); Ditmars, Rept. Book, 1907, p. 198; ? Grinnell, Univ. Calif. Publ. Zoöl., V, No. 1, 1908, pp. 163, 164 (San Bernardino Mts., Calif.); Atsatt, Univ. Calif. Publ. Zoöl., XII, No. 3, pp. 31, 50; Ruthven and Gaige, Occas. Papers Mus. Zoöl. Univ. Mich., No. 8, 1915, pp. 26-28 (comparison, *skiltonianus* with *gilberti*); Camp, Univ. Calif. Publ. Zoöl., XVII, No. 7, Dec. 28, 1916, p. 72 (places *gilberti* in synonymy of *skiltonianus*).

History. *Eumeces gilberti* was first recognized by Dr. John Van Denburgh, in a collection of reptiles made by Dr. Charles H. Gilbert and James M. Hyde in 1898, in and near Yosemite Valley, Mariposa county, California. The description is a careful one, and measurements are given of a series of paratypes. The young (snout to vent, 52 millimeters) are likewise described. The type chosen is No. 4139, Leland Stanford Junior University Museum, collected June 10-15, 1898.

In 1897 Van Denburgh, in his "Reptiles of the Pacific Coast," again describes this species and gives additional data and new locality records. He compares the form with *skiltonianus*. Here he states (p. 149), "Were it not for the different position of the light stripes of the young and the fact that this form seemingly does not occur in most parts of the range of *E. skiltonianus*, *Eumeces gilberti* might be regarded as a color phase of the western skink."

Between the time of its description and 1916 this species was generally accepted by herpetologists. In this latter year Camp (1916) discussed the specimens of *Eumeces* in the Museum of Vertebrate Zoölogy of the University of California, and pointed out that on the basis of coloration and markings all are one species (*i. e.*, *skiltonianus* and *gilberti*). He states: "The upshot of the matter, then, is that all the California *Eumeces* are to be considered as a single species, *skiltonianus*, which exhibits age and sex variations almost identical with those shown by the eastern skink, *E. quinquelineatus*. According to Cope (1900, pp. 636-637), *quinquelineatus* attains a much larger size in the more southern states than in the northern, there going through all the stages of coloration, and that the farther north the more is this restricted to the

primary pattern. A parallel situation seems to obtain in *skiltonianus*."

The comparison which Camp drew from Cope's statement (which is erroneous, due to the fact that Cope confused three eastern species) is to be given no weight.

Since 1916, on the basis of Camp's conclusions, the name *gilberti* has been relegated to the limbo of synonymy, no one, apparently, reviewing the same or other material to determine whether characters other than size might separate the two forms.

Van Denburgh apparently accepted Camp's conclusions with considerable reluctance, since, in his "Reptiles of Western North America" (pp. 585-586), he gives a complete separate description of *gilberti* (under *skiltonianus*). Speaking of Camp's action, he states: "It, therefore, seems necessary to regard all California skinks as belonging to one species, although no explanation has yet been given of the fact that this species in a portion of its range (southern California and the Sierra Nevada) grows much larger than elsewhere and develops a color phase—sometimes even in the young—which in other regions seems never to be fully shown. Under these circumstances, it seems best to give separate descriptions of the two phases although one name is used for both."

My study of this group of California skinks seems to vindicate Van Denburgh's belief in the distinctness of *E. gilberti*. Apparently the greatest difficulty in recognizing *gilberti* has been due to the fact that the young of *gilberti gilberti* and *skiltonianus* are very similar in general characters. Yet a careful comparison will doubtless show *gilberti* larger at hatching and with certain details of the color different from those of *skiltonianus*. There is usually no difficulty in recognizing the adults, although the color evolution brings a variety of age color-patterns that is very confusing when limited material is available.

With the recognition of the subspecies *Eumeces gilberti rubricaudatus*, a second difficulty is encountered. In the case of these forms, the young are strikingly different; however, the adults in some cases are very similar and difficulty may be met in separating them.

Diagnosis. A large species belonging to the *skiltonianus* group, having four bluish or whitish lines in the young; these lines soon fade and may be lost as early as the third year. The upper (dorsolateral) light lines occupy from one half to almost the whole of the second scale row, and are thus separated sometimes by only

two scale rows; the lateral light line is usually continuous from the rostral and usually with straight edges on the labials, wider than is usual in *skiltonianus*. The tail is blue. The lateral brown stripe is lost early. Adults with body rather stout, with the tail practically circular in cross section; the limbs long, overlapping in males, touching or narrowly failing to touch in the females. Scale rows, 24-26, the median widened; scales occiput to above vent average about 62.5; upper labials, eight; nuchals, one pair normally; two postmentals; one postnasal; superciliaries, normally seven; prefrontals forming a strong median suture; subcaudals, 112. Body brownish or greenish-olive, the scales sometimes darker

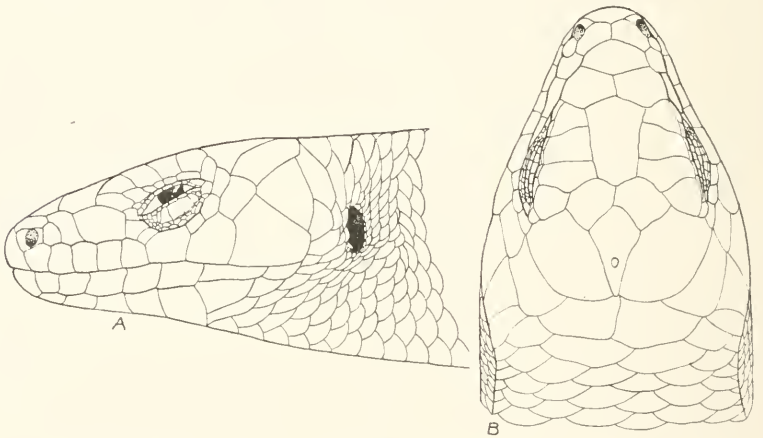

FIG. 71. *Eumeces gilberti gilberti* Van Denburgh. U. of C. No. 12611, east of Cooperstown, on county line between Stanislaus and Tuolumne Cos. A, lateral view of head; B, dorsal view of head. Actual head length, about 16 mm.; width, about 15 mm.

edged, rarely washed with reddish; toward tail, often verdigris-green; head bright poppy-red.

Description of species (chiefly from paratypes and topotypes). The portion of rostral visible above usually equals half (or more) of the frontonasal; supranasals moderate, slightly longer in proportion to width than in *skiltonianus;* frontonasal large, touching anterior loreal; prefrontals distinctly hexagonal, forming a strong median suture; frontal as long as, or minutely longer than, its distance from the end of the snout, touching three supraoculars; frontoparietals smaller than the prefrontals, forming a median suture; interparietal narrow, elongate, normally not enclosed by the parietals; parietals relatively short and wide; normally a single pair of large nuchals.

Nasal small, at least partially divided by a slight groove, the area of the anterior part greater than that of posterior part; postnasal invariably present; anterior loreal narrow, higher than wide; posterior loreal large, longer than high; normally seven superciliaries, the anterior large, broadly in contact with the prefrontal, more than twice as large as the posterior; four supraoculars; two presuboculars; normally four postsuboculars (occasionally three or five); a small preocular, followed by several small granules diminishing in size; upper median palpebral scales contacting the superciliaries; two small postoculars, the lower larger; the lower eyelid with four or five enlarged scales separated from the subocular labial by four rows of granules; primary temporal moderately large, in contact with the somewhat fanshaped lower secondary temporal; upper secondary subrectangular, slightly broader posteriorly than anteriorly; tertiary temporal elongate, bordering the upper secondary, separated from ear by a single scale.

Eight upper labials, five preceding the subocular; latter with a labial border a little greater than its height; eighth labial much larger than the seventh, followed by two pairs of postlabials, the lower anterior being much the largest and sometimes fused with the lower scale of the posterior pair; usually two well-defined auricular lobules; about twenty scales surrounding the ear; mental moderate, with a labial border a little longer than that of the rostral; six lower labials; two postmentals; these followed by three pairs of chinshields, the anterior pair in contact; postgenial large, normally bordered on anterior inner edge by a scale longer than wide.

Body scales on sides in parallel lines, the median dorsal rows wider than others; scales around head behind ear, 33; around narrow part of neck, 29-31; about middle of body, 24-26; about base of tail, 17. Subcaudals much widened, about 110-112 from anus to tip of tail; six preanal scales, the two median much the largest, the outer lateral scales overlapping the inner; lateral postanal scales more or less differentiated in males, usually showing in older specimens a distinctly raised and rounded surface; about 16 scales around insertion of arm; outer wrist tubercle clearly defined; several large, flat tubercles on palm, sometimes arranged in a V-shaped or triangular series; lamellar formula for fingers: 7; 10; 12; 13; 9. Heel plates very variable, usually four or five; sole with several large flat pads, sometimes forming a row to base of fourth toe; lamellar formula for toes: 7; 11; 14; 16; 10; toes surrounded by

only a dorsal and ventral series; the intercalated scales on outer side not extended the length of basal phalanx; lamellae not tightly bound about the claws. A series of small granular scales in the axilla; none or only a single row of tiny scales about posterior part of insertion of hind leg; 22 scales about insertion of hind leg; adpressed limbs overlapping about two millimeters in adult males, touching or failing to touch by one or two millimeters in adult females.

Color. Very young specimens are blackish or dark brown above, bordered by dorsolateral lines of grayish white which begin on the rostral or prefrontal and continue back, with a somewhat varying width, covering part of the third and two thirds to five sixths of the second row; the lateral light stripe appears to be continuous from the rostral, widens somewhat posteriorly, the edges appearing straight. It emerges from the ear, involving much more than the lower half of the ear and continues back chiefly on the sixth, but partially on the seventh, rows; the lateral brown stripe is very distinct and relatively narrow, involving two complete scale rows and the edges of the adjoining scale rows; below the lateral light line is a dim, narrow, gray-olive line. Belly below, grayish; tail blue, with a suggestion of lavender below.

In slightly older specimens the median part of the back becomes olive and the darker coloration remains bordering the dorsolateral line. During the third and fourth year the dorsolateral and lateral lines become olive as does the general coloration, while some trace of the lateral stripe can be traced to the fifth year. The blue of the tail is lost about the third year.

In adult male and female specimens, the color becomes nearly uniform, without a trace of dorsolateral or lateral lines. The general color is greenish-olive, sometimes showing bluish-olive with a slight brown wash. The head is colored almost uniformly red (yellow in preservative). The sides of the body are gray or bluish-gray. The chin and throat as well as part of the breast are uniform cream (red in life?) and this color extends upward, almost surrounding the ear. Limbs about the same color as body, the toes being somewhat lighter. Under surfaces of limbs and underside of the tail light cream color in alcohol.

Variation. I have examined forty specimens from the Yosemite region. The following variation is noted. Scale rows, 24-28, 24 occurring six times; 25, six times; 26, twenty-three times; 27, four times; 28, once. The number of scales from parietal to above vent

Measurements of *Eumeces gilberti gilberti* Van Denburgh

Museum Number** Sex	U.S.N.M. 45053 ?	C.U. 5812 ♂	C.U. 5827 ♂	S.U. 3416 ♂	C.U. 2505 ♂	C.U. 5826 ♂	S.U. 3428 ♂	C.U. 5821 ♀	S.U. 3114 ♀	S.U. 3430 yg.	C.A.S. 50157 yg.	C.A.S. 63969 ♀
Snout to vent	113	106	100	95	90	86	80	75	68	51	42	43
Snout to eye	8.5	.....	.....	7.5	.....	.....	6.9	.....	4.3	3.5	3.4	3.2
Snout to ear	20.5	.....	.....	19	.....	.....	15	.....	12	9.5	8.5	8
Snout to foreleg	34	32	33	30	28.6	29	25	23	20	16.5	14.5	15
Tail	180*	.....	149*	154*	.....	.....	139*	.....	.....	.....	72	70
Axilla to groin	62	59	52	46	49	49	42	44	40	28	23	23
Width of head	19	17	16.5	16	15	13	11	11	9	7	7	6
Length of head	19	18	16	17	16	13.7	13	12	12	9	8.2	8
Postanal width	14	12.2	12	12	12.2	11	9	8	8	5.5	.....	.....
Foreleg	26	24	23	30	22	20.5	20	18	18	13	11	10.8
Hind leg	35.5	28	32	33	32	29.2	27	25	23.5	19	15	14
Longest toe	12.5	10	10.5	11	11	10.2	10	8.9	8	6.5	5.5	6

* Regenerated.

** No. 45053 is from Bear Valley, Mariposa Co.; Nos. 5826, 5827, Pleasant Valley, Mariposa Co.; 5812, 5821, 3 miles from Coulterville, Mariposa Co.; 3416, Wawona, Mariposa Co.; 3428, 3430, 50157, 63969, Yosemite Valley, Mariposa Co.; 2505, Raymond, Madera Co.; 3114, between Groveland and Crockers, Mariposa Co.

are: 61, occurring five times; 62, fifteen times; 63, nineteen times; and 64, three times. The upper labials are 7-7 in three specimens; 7-8 in two specimens; 8-8 in thirty-five specimens. The nuchals are usually 1-1, this average being found in 30 specimens; 1-2 in five; and 2-2 in three specimens. The prefrontals are broadly in contact in 36 specimens, narrowly separated in four. Subdigital lamellae under the fourth toe (70 counts) are: 14, twice; 15, nine times; 16, thirty-nine times; 17, seventeen times; and 18, three times. The character of the postmentals, postnasal and supraoculars is constant. The parietals are separated in 37 specimens; in three they enclose the interparietal.

The specimens from Inyo county on the east slope of the Sierra Nevada differ somewhat. Nine specimens have an average of scales, occiput to anus, of 61.6; the number of scale rows averages a little lower, the number 24 occurring in five of the nine specimens. The nuchals are 2-2 in seven and 2-1 in two. The labials are 8-8 in all. The prefrontals are joined in six of the nine specimens. No young specimens were examined from the eastern slope. These Inyo county specimens are a little darker generally. Some trace of the dorsolateral line is visible until a somewhat greater age is reached, not so much by its remaining light but by slightly darker color which edges the scales of the two median rows.

I am, at least temporarily, associating with *gilberti gilberti* three specimens from San Joaquin county. This is done with considerable reluctance, as the color characters, combined with growth and scale characters (if constant), would warrant separation from this species. The adult female has four dark lines down the back, and the head is uniquely mottled. The lateral light lines are widened and the adpressed limbs widely separated. The general ground color is of a bluish-gray.

The two young are grayish olive with a suggestion of two darker, continuous or dotted lines on the back. The heads likewise show a mottled condition. The photographs are excellent, so no detailed discussion of the markings is given. (Pl. 38, figs. 1, 2, 4.)

The measurements of the large female (Cal. Mus. Zoöl. No. 3559) are as follows: snout to vent, 98 mm.; to eye, 6.2 mm.; to ear, 18 mm.; axilla to groin, 57 mm.; width of head, 15 mm.; length of head, 16.4 mm.; body width, 16 mm.; foreleg, 23 mm.; hind leg, 33 mm.; longest toe, 10.6 mm.; adpressed limbs fail to touch by 2 mm.

In the collection of the Museum of Vertebrate Zoölogy, University of California (No. 3985) is still another puzzling specimen (Pl. 38,

fig. 3) from Carbondale, Amador county, California. The specimen is an adult female having a much elongated body and relatively shorter limbs. The dorsolateral lines are evident, bordered on their inner side by a strongly defined series of deep black dots on the second scale row. The ground color is deep olive-brown. The lateral brown stripe is distinct but not of solid color. The lateral light line is also evident.

Measurements: snout to vent, 89 mm.; to eye, 6 mm.; to ear, 14.8 mm.; axilla to groin, 53 mm.; width of head, 10 mm.; length of head, 13.2 mm.; body width, 12 mm.; foreleg, 20.2 mm.; hind leg, 29 mm.; longest toe, 9.5 mm.; adpressed limbs fail to overlap by 8 mm.

FIG. 72. Distribution of *Eumeces gilberti gilberti* Van Denburgh and *E. g. rubricaudatus* subsp. nov., in Southwestern United States.

Locality records:

CALIFORNIA:

Mariposa Co.: Bear Valley, west slope of the Sierra (U.S.N.M. 1); Pleasant Valley, 600 ft. (Cal. U. 6); Coulterville, 3,200 ft. (Cal. U. 9); near Kinsley, 2,800 ft. (Cal. U. 4); Smith Creek, Coulterville (Cal. U. 1); Yosemite Valley, 4,000 ft. (Cal. U. 2) (Stanford 4); Anderson Flat, 3,400 ft. (Cal. U. 1); Dudley, 3,000 ft. (Cal. U. 1); Inspiration Point, Yosemite (Stanford 2); between Groveland and Crockers (Stanford 1); four miles from Wawona, 4,500 ft. (Stanford 1).

Madera Co.: Raymond, 940 ft. (U.S.N.M. 1) (Cal. U. 5); Jesbel, 540 ft., 8 miles NW Raymond (Cal. U. 1); Norfolk (Cal. U. 1).

Tulare Co.: Monache Meadows, Sierra Nevada (Cal. U. 1); Strathmore (Cal. U. 1); White River (Stanford 1).

Stanislaus Co.: La Grange, 6,054 ft. (Cal. U. 1); East Cooperstown, on county line between this and Tuolumne Co. (Cal. U. 1); Berkeley, Tuolumne Camp (Cal. U. 1).

Inyo Co.: Panamint Mts. head of Willow creek, 7,000 ft. (U.S.N.M. 1); Argus range, Manturango Spring (U.S.N.M. 2); Johnson Cañon, 6,000 ft. (Cal. U. 1); Panamint Mts. (Cal. U. 3) (C.A.S. 1); Honopee Cañon (Field 5); Beveridge Cañon (Field 1); Coso Valley (Field 1).

ARIZONA:

Yavapai Co.: Prescott (U.S.N.M. 1).

Eumeces gilberti rubricaudatus subsp. nov.

(Plate 39; Figs. 72, 73)

SYNONYMY

1882. *Eumeces skiltonianus* Yarrow. Bull. U. S. Nat. Mus., No. 24, 1882, p. 41 (part.); Stejneger, N. Amer. Fauna, No. 7, 1893, pp. 201-212 (part.) (Fort Tejon); Van Denburgh, Occ. Papers Calif. Acad. Sci., V, 1897, pp. 144-147 (part.) (Fort Tejon); McLain, Contr. N. Amer. Herp., 1899, p. 10 (Chihuahua Mts.); Van Denburgh, Proc. Calif. Acad. Sci., (4), III, Jan. 17, 1912, p. 147 (Lytle creek, San Bernardino county); Atsatt, Univ. Calif. Publ. Zoöl., XII, No. 3, 1913 (part.) (San Bernardino Mts.); Camp, Univ. Calif. Publ. Zoöl., XVII, No. 7, Dec. 28, 1916, p. 72 (part.); Grinnell and Camp, Univ. Calif. Pub. Zoöl., XVII, No. 10, July 11, 1917, pp. 175, 176.

1908. *? Eumeces gilberti* Grinnell. Univ. Calif. Publ. Zoöl., V, No. 1, pp. 163, 164 (non Van Denburgh) (Santa Ana Cañon, San Bernardino Mts.).

1917. *Plestiodon skiltonianus* Grinnell and Camp. Univ. Calif. Publ. Zoöl., XVII, No. 10, pp. 175, 176 (part.); Van Denburgh, Occ. Papers Calif. Acad. Sci., X, 1922, pp. 578-587 (part.), pl. 56 (*Eumeces skiltonianus*).

In examining the preserved skinks from the region about Fresno and localities to the south, it was noted that, instead of having the blue tails typical of *skiltonianus* or *gilberti gilberti*, the young skinks have tails which lack all dark pigment and are of a uniform whitish or pinkish color. Tags or published data called attention to the fact that the tails of specimens just captured were red or pink. It was furthur noted that these young bore the scale characters of a large form which likewise occurred in the San Joaquin Valley and the region to the south as far as Baja California—a form re-

sembling *gilberti gilberti* in size and both *skiltonianus* and *gilberti gilberti* in numerous scale characters. There were, however, in the upper part of the range no blue-tailed young of any kind, and in the southern part of the range the only blue-tailed forms were those of the *skiltonianus* occurring in southern California (parietals usually enclosing interparietal, and usually only seven supralabials). In this region were also occasional young specimens with uniformly colored, red or pink tails, differing from the blue-tailed form in lacking an enclosed interparietal and in having usually eight instead of seven upper labials. Other less obvious differences, such as in the color details of the upper labial line, greater width of the dorsolateral line and the higher average count of scales both under the tail and from occiput to above vent, were evident.

That the two species *gilberti rubricaudatus* and *skiltonianus* occur in the same general territory and maintain completely separate identity, precludes any possibility of considering the former either as a subspecies or as a color variety of *skiltonianus*.

Although some of the larger adults of *gilberti rubricaudatus* bear a certain resemblance to some specimens of *gilberti gilberti*, I am not certain that they should be regarded as subspecies, despite the absence of striking scale characters. It is obvious that the forms occupy contiguous territory. It may be that the barrier is one of altitude. Final judgment on the relationship of *rubricaudatus* and and *gilberti*—whether specific or subspecific—must await thorough collecting in the region where the two forms occupy contiguous territory or where their ranges overlap. A few problematic specimens from the region of Calaveras and Jan Joaquin counties may offer a clue to the relationship. However, this material is too meager to draw fast conclusions. These specimens are discussed elsewhere. Nevertheless, in this work I am regarding the forms as subspecies, influenced in some measure by the opinions of Dr. Joseph Grinnell and Dr. Jean Linsdale, who regard this as being the most probable relationship.

Diagnosis. Young with four light yellowish or whitish lines, the dorsolateral pair originating on anterior part of head, passing to tail along the second and third scale rows, and occupying from one half to four fifths of the second row; lateral line beginning on the anterior labials and passing straight back, involving all except upper edge of auricular rim, thence passing to tail, covering the sixth scale row and edges of the adjoining rows; darker line below lateral line very dim or entirely wanting; tail bright, uniform pink or red,

lacking dark pigment. Adults lacking all stripes, olive above, the scales edged with brownish, the tail much lighter brown; entire under surface of tail uniform light cream (in alcohol), or edges of subcaudals may have a slight edging of lead color (in the southern specimens). Upper labials normally eight (rarely seven); 24 to 26 scale rows, usually 24; parietals not in contact; scales occiput to above vent 61-64 (average 62.3); nuchals more frequently two than one (average 1.7); postmentals two; superciliaries seven; pre-

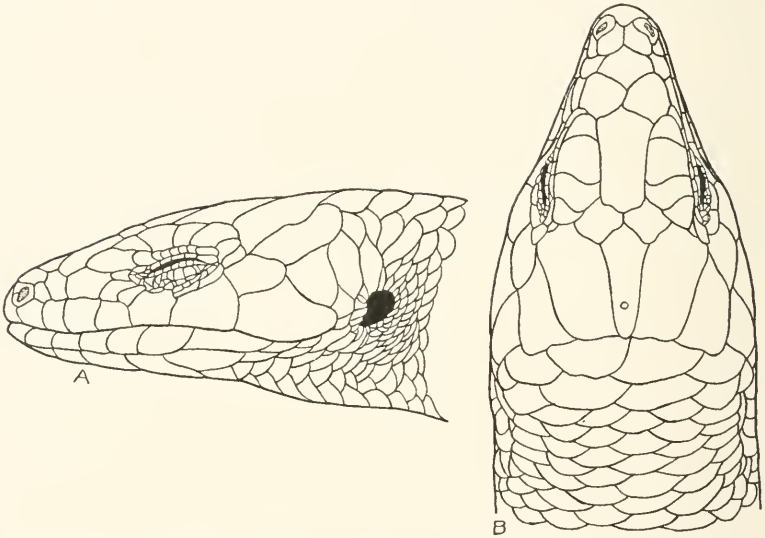

FIG. 73. *Eumeces gilberti rubricaudatus* subsp. nov. Cal. U. No. 560; Old Fort Tejon, Kern Co. A, lateral view of head; B, dorsal view of head (parietal region drawn more elongate than actual). Actual head length, 13.2 mm.; width, 10.8 mm.

frontals in contact or not, usually the former. Adpressed limbs in males may touch or overlap; in adult females they are separated.

Description of Type (C.A.S. No. 39002, Tehachapi Mts., Calif.). Portion of rostral above small, less than half the size of the frontonasal; supranasals moderate, forming a suture; prefrontals larger than frontoparietals, forming normally a median suture; frontal longer than its distance from the tip of the snout, touching three supraoculars; frontoparietals small, quadrangular, forming a median suture; parietals not enclosing the elongate interparietal; two pairs of nuchals, the anterior with much the greater depth; nasal small, at least partly divided; postnasal present; anterior loreal much higher than posterior, touching the frontonasal; posterior loreal

very much longer than high; four supraoculars; seven superciliaries, the anterior large and in contact with the prefrontal; two presuboculars; three postsuboculars; primary temporal rather large, touching lower secondary; upper secondary temporal large, distinctly wider posteriorly than anteriorly; tertiary temporal touching upper secondary, narrow, elongate, separated from the ear by small granules; upper labials eight-seven, the last very much larger than the adjoining labial and separated from the ear by a pair of postlabials and a pair of very minute scales; mental rather small, with a somewhat larger labial border than rostral; two postmentals; five or six lower labials; three pairs of chinshields; large postgenial bordered by a scale longer than wide; eye moderate, about equal in length to its distance from the nostril; ear typical, with two well-defined auricular lobules; about 21 scales around ear.

Scales in 31 rows about the neck, 33 rows at axilla, 26 rows about middle of body, and 14 rows about tail at first widened subcaudal; scales on sides parallel; the two median dorsal rows not or but slightly widened; subcaudals widened.

Limbs moderately long, barely touching when adpressed. Other characters not mentioned are generally as in *Eumeces gilberti gilberti*.

Color. The young are generally brownish-black above. The dorsolateral greenish or gray-white lines arise on or near the rostral and continue back to the base of the tail, occupying about three fourths or four fifths of the second scale row and the inner half of the third, with the edges of each scale slightly darker. The dorsal blackish ground color extends beyond the base of the tail, a distance about equal to the length of the hind leg. The lateral white or cream line begins on the third upper labial (the first and second brown-white), passes under the eye, widens on the posterior labials and involves all except the extreme upper and lower margins of the ear. On the sides of the body it occupies most of the fifth and a half of the sixth scale rows; no dark line is present below the lateral. The lateral region between the light lines is slightly darker than the back; the belly is gray or bluish-gray. The lower labials, the region below the ear, the breast, under side of the arms and legs and the entire under side of the tail are light cream or pinkish cream. The tail is red or pink in life. This color begins to disappear about the second or third year, and by the fourth year (50 to 60 mm.) it appears to be lost entirely (preserved material).

The adults vary somewhat, but the general color is uniform olive

brown, each scale showing a slightly browner edge. Traces of a lateral dark stripe may persist until a length of 80 mm. is attained in females, but is probably lost earlier in males. The head apparently does not assume the uniform red coloration found in *gilberti gilberti;* at least there is no suggestion of the typical coloration of preserved *gilberti gilberti* in the preserved specimens of *gilberti rubricaudatus.* There is, at least in many specimens, a total absence of the lines on the under side of the tail typical of *skiltonianus* and *gilberti.*

Measurements of *Eumeces gilberti rubricaudatus* subsp. nov.

Museum Number* Sex	C.A.S. 40301 ♂	U.S.N.M. 20385 ♂	U.S.N.M. 11799 ♂	C.A.S. 39002 ♂	C.U. 5560 ♀	C.A.S. 39001 ♂	C.A.S. 35363 yg.
Snout to vent	101	96	86	88	87	51	39
Tail	.....	.....	.....	†125	.....	.....	66
Snout to eye	8	8	6	6.3	5.5	3	2.5
Snout to ear	19.5	20	16	16	14.5	9.8	9
Snout to foreleg	33	32	30	28	25	17.4	15
Axilla to groin	53	50	53	55	54	29	19
Width of head	16.5	16.2	14.6	12	10.8	7	6
Length of head	17	17.3	15	15	13.2	9.5	7.6
Postanal width	13.5	12	11	9	8	6	4
Foreleg	25	23.2	19	21	20.2	12	10.6
Hind leg	36	32	27	29	25	18	15
Longest toe	13	12	8.5	9.2	6.2	6	5

* 40301 is from Campo, San Diego Co.; 20385, from Witch Creek, San Diego Co., Cal.; 11799, Fresno, Cal.; 39002, Fresno; 5560, Tehachapi, Grapevine Cr., Old Fort Tejon; 39001, Tehachapi Mts.; 35363, Witch Creek, San Diego Co.

† Regenerated tip.

Variation. The length of the limbs of this form, as is true of many species of *Eumeces,* differs in the males and females. In the latter the limbs are actually shorter and the axilla to groin measurement is greater than in males having the same snout to vent measurement. It appears that there is a slight difference in specimens from the northern and southern part of the range. The material is especially inadequate for drawing conclusions, but it appears that the specimens in the San Joaquin Valley are more slender than those in San Diego Co., although the young are practically indistinguishable. The limbs touch and overlap slightly in males and are more or less widely separated when adpressed in females.

The interparietal is apparently never or but rarely enclosed by

the parietals. The scales from the occiput to above anus vary between 61 and 64 (average 62.3); scale rows on neck, from 27 to 30, slightly higher in the southern part of the range; scales about middle of body, 24 to 26, 24 occurring more than twice as frequently as 25 or 26. The upper labials are 8-8 or 8-7; only two specimens examined had 7-7. The nuchals are most frequently 2-2 or 2-1, the formula 1-1 occurring in only 6 percent of the specimens examined. The frontonasal is in contact with the frontal in about 40 percent of the specimens examined, and is invariably in contact with the first loreal. The lamellae under the fourth toe vary between 14 and 18; the higher numbers are more frequent. The superciliaries vary between six and eight, seven being the most frequent number.

Distribution. The distribution of the red-tailed form is from Fresno Co., Cal., south through the lower part of the San Joaquin Valley, through the Tehachapi Mts. south to northern Baja California. Much collecting in the southern region will have to be done before more exact limits can be traced. (See Fig. 72 for distributional map.)

Locality records:

CALIFORNIA:

Fresno Co.: (U.S.N.M. 1).

? Friant: (M.C.Z. 6).

Tulare Co.: (Cal. No. 7403).

Kern Co.: ? Fort Tejon (U. S. N. M. 4, also with label, Cape St. Lucas B. Cal.); Grapevine Cañon, Old Fort Tejon (Cal. U. 1); Old Fort Tejon (U.S.N.M. 1); Tehachapi Mts. (Cal. U. 1) (U.S.N.M. 1) (C.A.S. 1); Rosedale (Cal. U. 2).

Riverside Co.: Strawberry Valley, 5,500 ft., San Jacinto Mts. (Cal. U. 1).

San Diego Co.: Santa Ysabel, Witch creek (U.S.N.M. 1); Witch creek (C.A.S. 1); Jacumba Hot Springs (U.S.N.M. 1); Mussey (K.U. 1); Chihuahua Mts. (Stanford 1); ? Campo (C.A.S. 1); Doane Valley, Palomar Mt. (Klauber 1); Deerhorn Flat (S.D.S.N.H. 1); Lawson Valley (S.D.S.N.H. 1).

QUADRILINEATUS GROUP

This group includes a single medium-sized eastern Asiatic species, characterized by the absence of a median line or bifurcating head lines. A dorsolateral and lateral line are present.

Median scale rows widened, number around body reduced to 20. Most of the palpebral scales in contact with the superciliaries. Three pairs of nuchals; parietals enclose interparietal. Limbs elongate, overlapping. No small scales behind insertion of femur.

It seems probable that this is an Asiatic relative of the *Skiltonianus* group. Unfortunately a very limited amount of material has been available and not a single young specimen has been seen.

Eumeces quadrilineatus (Blyth)

(Plate 40, Fig. 1; Figs. 74, 75)

SYNONYMY

1853. *Plestiodon quadrilineatum* Blyth. Journ. Asiatic Soc. Bengal, XXII, 1853, p. 652 (type description; type locality, China [Hongkong ?], J. C. Bowring Esq., Coll.; type in Asiatic Society Collection).

1860. *Eumeces quadrivirgatus* Hallowell. Proc. Acad. Nat. Sci. Phila., 1860, p. 502 (Hongkong, collected by Mr. Wright, May 4, 1854; an apparently older tag in the bottle gives Stimpson as collector).

1864. *Mabouia quadrilineata* Günther. Rept. Brit. India, 1864, pp. 82, 83, pl. X, fig. 3 (redescription); Theobald, Cat. Rept. Mus. Asiat. Soc. Bengal (extra number Journ. Asiat. Soc. Bengal, No. CXLVI), 1866, p. 24 (Hongkong).

1879. *Eumeces quadrilineatus* David. Jour. de mon Trois. Voy. d'Explor. dans l'Emp. Chinois, I & II, Paris, 1875; Bocourt, Miss. Sci. Mexique, Rept., Liv. 6, 1879, p. 423, pl. XXII D, fig. 5 (Cambodia; specimen in the Paris Museum); Boulenger, Cat. Rept. Brit. Mus., 1887, p. 381 (redescription, Hongkong); Günther, Ann. Mus. Zoöl. St. Petersbourg, I, 1896, pp. 199-219 (Szechuan); Werner, Abh. K. Bayer Akad. Wiss. II, Kl. XXII, Bd. II, Abt., 1903, pp. 343-384 ("Szetschwan," Kwangtung); Mocquard, La Revue Coloniale, July, 1906, (1907), p. 37; Mell, Arch. Naturg. 88, Abt. a, 10 Heft. 1922, pp. 100-134; Schmidt, Bull. Amer. Mus. Nat. Hist., LIV, Art. 3, p. 428, fig. 12 (description of a specimen from Hainan with figure of head); Smith, Journ. Siam Soc. Nat. Hist., Suppl., VIII, No. 1, Dec., 1929, p. 49 (Muak Lek near Korat, Siam; Manson Mts., Tonkin); Mell, Beitr. zur Faun. Sin., IV, Grundz. Okol. Chin. Rept. Berlin-Leipzig, 1929, pp. 11, 27, 28, 209; Gee, Bull. Dept. Biol. Yenching Univ., I, No. 1, 1929, p. 63.

History. The type of *Eumeces quadrilineatus*, collected (presumably on Hongkong) by J. C. Bowring, Esq., reached the collection of the Asiatic Society of Bengal, and was described briefly by E. Blyth in the journal of that society in 1853 as *Plestiodon quadrilineatum*. Blyth notes a similarity of this form to *Plestiodon laticeps* of America. When Theobald prepared his catalogue of the reptiles of the Asiatic Society of Bengal (1866), he notes this specimen as follows: "*M.* [*abouia*] *quadrilineata*, Blyth J. A. S. XXII, 652 (labeled *Plestiodon quinquelineatum*, L, North Carolina, Rev. F. Fitzgerald) a. Fine specimen—Hongkong—J. C. Bowring, Esq." It may be presumed that a part of the type series (certainly topotypes) were sent to the British Museum, for Günther in 1864 had available two specimens, likewise collected by J. C. Bowring in Hongkong.

Specimens of this species were collected May 4, 1854, in Hongkong by Mr. Wright (a tag in the container also credits the specimen to Stimpson) and these specimens reached the United States National Museum prior to 1860 when Hallowell published a description of the form under the name *Eumeces quadrivirgatus*, apparently

unaware that the species had already been described by Blyth. This specimen (U.S.N.M. 7498) is still extant, but in poor condition. It is softened, and most of the scales have slipped, and to a large extent the color pattern is obscured.

Bocourt (1879) lists a specimen from Cambodia, French Indo-China, then in the Paris Museum of Natural History. Schmidt (1927) reports a specimen from Hainan, and Smith (1929) reports the discovery of the species near Korat, Siam.

I believe that there are but two specimens in American museums, one, No. 30197, in the American Museum of Natural History, and the type specimen (U.S.N.M. 7498) of *Eumeces quadrivirgatus*. I was unsuccessful in obtaining the species in my collecting on Hongkong.

Diagnosis. A medium-sized species, characterized by a pair of dorsolateral greenish-white lines beginning on the rostral, and following the second scale row to some distance on the tail; a lateral light line from the labials passes through the lower part of the ear and continues to the groin; ventral surfaces white.

One postnasal; two postmentals; three pairs of chinshields, with a very large postgenial which is bordered by narrow, elongate scales; seven upper labials (rarely eight), the last largest; four supraoculars; parietals enclose the interparietal; superciliaries in contact with the upper palpebrals; outer preanals overlap inner; subcaudals widened; granular scales in the axilla; none behind the hind leg; fingers and toes with an intercalated series of scales on the outer side of digits (making three rows surrounding the toes); terminal lamellae not tightly bound about the base of the claws; twenty scale rows about the middle of the body.

Description (from AMNH No. 30197, collected in the mountains south of Nodoa, Hainan). Snout moderately short, the portion of the rostral visible above less than half the size of the frontonasal; supranasals large, forming a median suture, touching the postnasal and first loreal; frontonasal large, broader than long, touching the anterior loreal; prefrontals forming a relatively broad median suture, and forming sutures with the frontonasal, frontal, posterior loreal, first supraocular, first superciliary and the anterior loreal, the length of the sutures in the order named; frontal relatively short, obtusely angulate at both ends, shorter than its distance from the end of the snout; frontoparietals elongate, larger than the prefrontals or interparietal, forming a median suture; interparietal small, enclosed by the large parietals; three pairs of nuchals, the

anterior shorter transversely, but wider (longitudinally) than the two succeeding pairs.

Nasal moderate, divided, the sutures from nostril reaching the supranasal and first labial; the nostril pierced posterior to the rostrolabial suture; postnasal small, touching two labials; anterior loreal high and narrow, somewhat higher than the posterior, which is large and longer than high; seven-eight superciliaries, the anterior slightly larger than the posterior; a small square preocular, and two small postoculars; four supraoculars, the three anterior touching the frontal; two presuboculars and four postsuboculars;

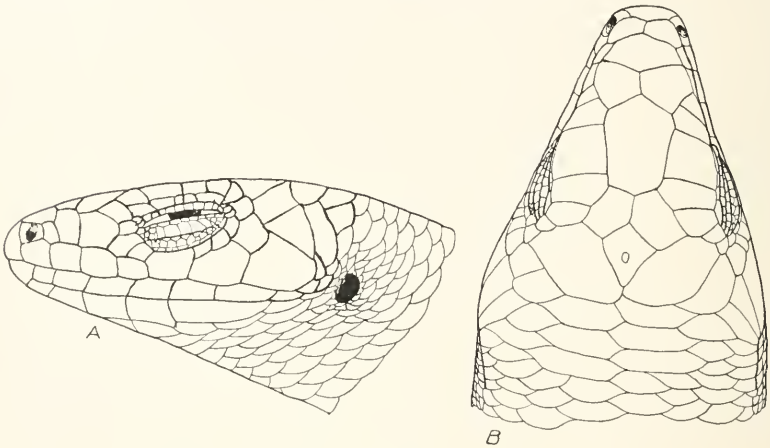

Fig. 74. *Eumeces quadrilineatus* (Blyth). A.M.N.H. No. 30197; South mountains, Nodoa, Hainan. A, lateral view of head; B, dorsal view of head. Actual head length, 14 mm.; width, 12 mm.

most of the upper palpebrals touch superciliaries; four enlarged scutes on lower eyelid, separated from the subocular by three rows of granular scales; primary temporal square, touching the triangular lower secondary temporal narrowly; upper secondary temporal large, slightly wider posteriorly (broken on the left side into two parts); tertiary temporal touches the upper secondary but is separated from the nuchal by a single scale, and from the auricular opening by two scales; seven upper labials (eight on left side), the first normally not larger than others preceding the subocular; seventh labial very large, separated from the ear by two pairs of postlabials (on left side the two lower scales of each pair fused); auricular lobules two, not conspicuously enlarged; about eighteen scales surround the ear.

Mental large, with a labial border much longer than that of the

rostral; six lower labials; two postmentals, the second largest; three pairs of chinshields, the posterior largest, the anterior pair in contact; the postgenial scale is especially large, bordered on the inner side by two very narrow, elongate scales.

Body scales in parallel rows, the two median rows very distinctly widened; fifty-four scales in a row from parietals to above vent. Scale rows about neck behind ear, 30; on constricted portion of neck, 26; in axillary region, 30; about middle of body, 20; 14 about the base of the tail. Scales in the postauricular, posthumeral, axillary and postfemoral regions with several (three to six) minute pits. Fifteen scales about the insertion of the forearm; wrist tubercle double, conical; three conical palmar tubercles, the basal digital lamellae conical, as are certain subarticular lamellae. Lamellar formula for fingers: 6; 9; 14; 13; 8 (left hand amputated). A small area of granular scales in axilla. Scales about insertion of hind limb, 19; heel with two conical tubercles, separated by a row of granules, the inner preceded by another conical tubercle; outer part of sole with rather large imbricating scales; basal lamellae tubercular; lamellar formula for toes: 6; 12; 14; 19; 14. Six preanals, the two median greatly enlarged, the outer smaller scales overlapping the inner; subcaudals greatly widened; lateral postanal scale small, not or but slightly differentiated. Adpressed limbs overlap the length of seven scales; postfemoral scales not differentiated.

Color. Back dark gray-brown, the head more yellowish-brown

Measurements of *Eumeces quadrilineatus* (Blyth)

Museum	A.M.N.H.	Type	Brit. M.*
Number	30197	.....	.....
Sex	♂	.....	.....
Snout to vent	73	70	55
Tail	63 reg.	121	85
Snout to eye	4.8	.....	.....
Snout to ear	14	.....	.....
Snout to forelimb	26	.....	.....
Axilla to groin	40	.....	.....
Width of head	12	.....	8
Foreleg	22	.....	15
Hind leg	28	24	22
Longest toe	10.2	.....	.....

*Boulenger, 1887, p. 381. Hongkong.

with a slightly darker area in the interparietal region; a silvery dorsolateral line extends from the parietals to more than halfway the length of the tail, covering the greater part of the second scale row as far as the tail, and here it encroaches on the median scale row; the lateral line can be traced from the lower edge of the ear along the side a short distance where it becomes lost in the silvery-gray lateral coloration; below uniform dirty brownish-cream. Area between the lateral and dorsolateral line of the same color as back.

Variation. The scale characters given in this description differ in no pertinent detail from data given in other descriptions. The type of *Eumeces quadrivirgatus* Hallowell has the following characters: nuchals, 2-3; the number of supraoculars touching the frontal is two on one side, three on the other; superciliaries, 7-7. The formula of the body scales is: 30 behind ear; 27 neck; axillary region, 27; middle of body, 20. Lamellae under the fourth toe, 19-20. The postgenial very large, bordered on inner side by a scale wider than long, and followed by three narrow scales.

The dorsolateral light line begins on the rostral, continues back, occupying a little more than half the second scale row, but is nearer the inner than outer side; the lateral line borders the lower edge of the ear, then follows along the middle of the fifth scale row. The area between the dorsolateral and the lateral lines is a deeper brown than the back; there is a brownish stripe below the lateral light line. The abdominal scales show slightly darker areas. The tail is broken.

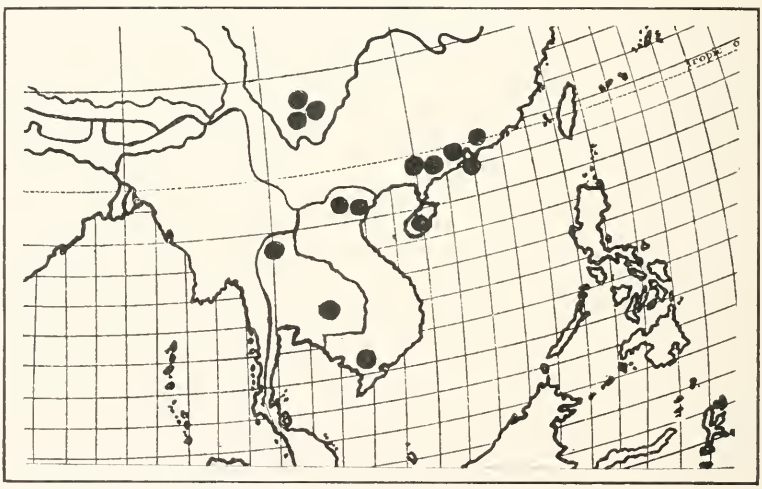

FIG. 75. Distribution of *Eumeces quadrilineatus* (Blyth), in Southeastern Asia.

Distribution. The species is known from Siam, French Indo-China, southern China and Hainan. It appears to be rare.

Locality records:

SIAM: Muak Lek near Korat (Brit. Mus. 1); Doi Nang Ka Mt., 20 miles north Cheingmai (Brit. Mus. 1, M. Smith Coll.).

FRENCH INDO-CHINA: Manson Mts. Tonkin 3, 4,000 ft. (Brit. Mus. 1); Cambodia (Paris Mus. 1).

CHINA:

Kwangtung: (Z.S.S. München 10); Hongkong (Brit. Mus. 2) (Asiat. Soc. Bengal Mus. 1; type, Bowring Coll.); Hainan (A.M.N.H. 1).

Szechwan: (Z.S.S. München 16) (David, 1875) (Günther, 1896).

THE BREVIROSTRIS GROUP

The species associated in this group include *Eumeces dugesii, colimensis, dicei, ochoterenae, indubitus* and *brevirostris.* This group, which is probably most closely related to the *Skiltonianus* group, appears to be confined to Mexico.

The group may be characterized as follows: Small or medium-sized species, in which the scale bordering the postgenial is wider than long; there is but a single postmental scale, and the postnasal is wanting. In most of the species the seventh labial is in contact with the upper secondary temporal (variable in *ochoterenae*).

The basic color pattern is four-lined, but there is a strong tendency to reduce the lines posteriorly in certain species. There is no trace of a median line, or lines on the head. Usually the dorsolateral lines are separated by more than two whole and two half scale rows (less in *ochoterenae*).

The relationship with the *Skiltonianus* group is shown in the primary color pattern; the tendency for the interparietal to be enclosed by parietals; and the tendency for the large last labial to form a suture with the upper secondary temporal (occurs in *lagunensis* and as an occasional anomaly in *skiltonianus*).

KEY TO THE SPECIES OF THE BREVIROSTRIS GROUP

A. Supraoculars 3; subcaudals usually less than 95; ovoviviparous; scale rows 24; two pairs of nuchals; parietals enclose interparietal; five-six superciliaries; primary temporal small; seventh labial forms a suture with the upper secondary temporal, the lower secondary small; eleven-twelve lamellae under fourth toe; two supraoculars touch frontal; dorsolateral and lateral lines lost on back and side in young and adults; max. size 67 mm. (Guanajuato and Michoacan, Mexico) ..... *Eumeces dugesii* Thominot, 472

AA. Supraoculars four.

B. Frontal in contact with interparietal; limbs much enlarged, broadly overlapping when adpressed; prefrontals separated; two pairs of nuchals; primary temporal absent or fused with upper secondary; seventh labial broadly in contact with the upper secondary temporal; lower secondary temporal present; dorsolateral lines broad, continue to tail, separated by eight scale rows; two or three supraoculars touch frontal; max. size 69 mm. (Colima, Mexico) ... *Eumeces colimensis* Taylor, 478

BB. Frontal not in contact with interparietal.

C. Primary temporal wanting or fused with upper secondary temporal; lower secondary temporal wanting; 22–24 scale rows; eleven scales about ear opening; parietals do not enclose interparietal; last labial broadly in contact with upper secondary temporal; twelve lamellae under fourth toe; dorsolateral line to tail; lateral line to ear; adpressed legs very widely separated (18 scales); max. size, 47 mm. (Northeastern Mexico).

Eumeces dicei Ruthven and Gaige, 482

CC. Primary temporal present; lower secondary temporal present but small; seventh labial in contact with the upper secondary temporal (except in certain specimens of *ochoterenae*, in which case the parietals are not enclosed, and the primary temporal does not approach the size of the upper secondary temporal).

E. Dorsolateral lines broad, occupying outer two thirds of second scale row and inner half of third, extending onto proximal third of tail; a lateral line passes to arm, involving lower edge of ear; bluish color of tail retained more or less in adults; 22–24 scale rows, usually 22; nuchals, two pairs; 54 scales from parietals to above anus; parietals do not enclose interparietal; upper secondary temporal sometimes in contact, sometimes not, with last labial; twelve lamellae under fourth toe; body small, slender; max. size 56 mm. (Southern Mexico.)

Eumeces ochoterenae Taylor, 485

EE. Dorsolateral lines longer or shorter, but if extending to tail, follow third row of scales, leaving lines separated by four whole scale rows.

F. Larger robust form; 22–24 scale rows; parietals enclosing interparietal; lateral line to ear; dorsolateral line not extending back of shoulder; tail blue in young, color lost in adult. (Southern part of Mexican Plateau.....*Eumeces indubitus* Taylor, 466

FF. Usually smaller, extremely variable; parietal enclosed or not; lateral line to ear or farther; (if only to ear, dorsolateral line usually more or less distinct for more than half the length of body). (Southern part Mexican Plateau.)

Eumeces brevirostris (Gunther), 459

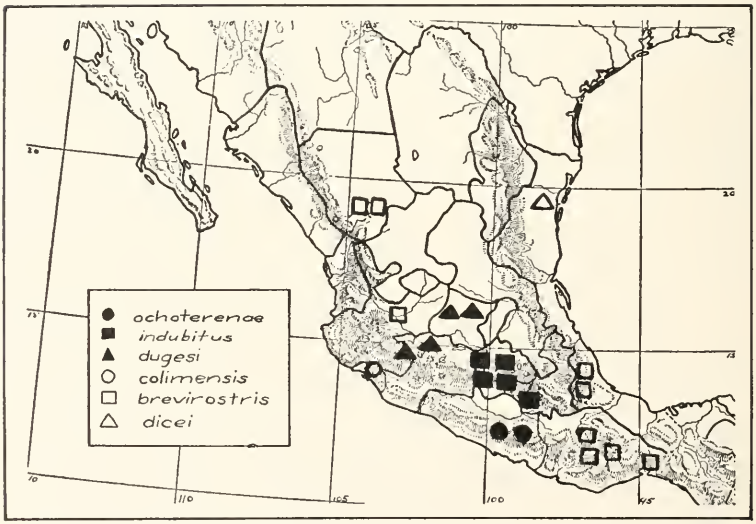

FIG. 76. Distribution of the species of the *Brevirostris* group in Mexico.

Eumeces brevirostris (Günther)

(Plate 41; Figs. 76, 77)

SYNONYMY

1860. *Mabouia brevirostris* Günther. Proc. Zoöl. Soc. London, 1860, pp. 316, 317 (type description; type locality, Oaxaca, Mexico); Ann. & Mag. Nat. Hist., 1860, p. 442, pl. VI; Garman, Bull. Essex Inst., V, Jan. 9, 1884, p. 16 (listed under *Eumeces*).

1879. *Eumeces brevirostris* Bocourt. Miss. Sci. Mexique et Cent. Amer., Rept., Liv. VI, 1879, pp. 439-440, pl. XXIIA, fig. 7, 7a, 7b, and pl. XXIIE, fig. 1a (complete description); Cope, Proc. Amer. Phil. Soc., XXII, Jan. to Oct., 1885, p. 170 (Key); Günther, Biol. Cent. Amer., Rept. Batr., 1885, p. 32, pl. 22, fig. b; Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 379 (Oaxaca; Ciudad; Forrer Coll.); Cope, Bull. U. S. Nat. Mus., No. 32, 1887, p. 46 (part.) (Vera Cruz, Tehuantepec, Oaxaca; record for "Valley of Mexico" or "Toluca" is *Eumeces copei* Taylor); Cope, Ann. Rept. U. S. Nat. Mus., 1898 (1900), p. 630 (Key); ? Gadow, Proc. Zoöl. Soc. London, 1905, p. 218 (*Eumeces brevirostris?*).

History. Albert Günther described this species in 1860, under the genus *Mabouia*, from a specimen collected in Oaxaca (presumably the city), Mexico, by Auguste Sallé, probably about 1855, and sent to the British Museum. The single type is an adult. The type description is very incomplete, the author comparing the species with *Mabouia agilis*, stating that "The general arrangement of the shields of the head being the same as in *Mabouia agilis*—it does not appear necessary to give a detailed description." Bocourt (1879) gives a careful description of the species from two topotypes collected by Sallé in Oaxaca, and states that the specimen is "entièrement identique au type unique." He fails to note the unusual relationship of the temporals.

Boulenger (1887) redescribes the types specimen, giving some details omitted by Günther, and records two additional specimens collected by Alfonso Forrer in Ciudad (this is very probably a village of that name near Durango, Durango, Mexico, situated on the trail between Mazatlán and Durango).

Mr. H. W. Parker, who courteously examined the type for me, states in a letter: "There were only three specimens in the British Museum when the Biologia was written and of these only one with a complete tail is the type. Consequently the figure must have been drawn either from this specimen or from imagination. Actually, the enlarged drawing of the head scales is most inaccurate; for instance, the length of the frontoparietal is only contained once and a quarter in the interparietal length instead of as shown, and the relationship of the first supraocular to the frontal is more as shown in the small figure to the right than as depicted in the large one."

The specimen which was described by Cope (1885, p. 387) as *Eumeces brevirostris* var, is a specimen of *Eumeces copei* Taylor.

The United States National Museum obtained three specimens

from Francis Sumichrast (Nos. 30213, 30089; 39089). E. W. Nelson and E. A. Goldman obtained a typical specimen at La Parada, Oaxaca (USNM No. 46682). It is from this specimen that the following description is taken. A few other specimens are in museums; these are listed in the locality records. Whether the specimens in foreign museums are identified correctly I cannot say, since I have not seen them. In many cases no descriptions of these have been published, the lists having been furnished to me in letters by curators of collections in various museums. Boulenger has, I believe, erroneously placed *Eumeces dugesii* Thominot as a synonym of this species. (Note remarks under that species.)

Diagnosis. The dorsolateral line originates on the rostral and continues back a variable distance on back; the lateral line may extend to tail, or terminate in front of ear; seventh labial very large, forming a broad suture with upper secondary temporal; lower secondary temporal widely separated from primary; tertiary temporal present or absent. Scale rows, 22 or 24; no postnasal; one postmental; seven upper labials; prefrontals in contact or not; parietals enclose interparietal or not; two pairs of nuchals, the anterior much the larger; limbs short, widely separated when adpressed; postgenial bordered by a scale wider than long; palm with its largest tubercle at base of inner finger.

Description of species (from U.S.N.M. No. 46682 from La Parada, Oaxaca, Mexico; Coll. Nelson and Goldman, August 19, 1894). Adult male: Portion of rostral visible above, distinctly smaller than frontonasal; supranasals large, approaching the size of first loreal, forming a median suture; frontonasal large, broader than deep, touching anterior loreals laterally; prefrontals large, touching both loreals, also forming sutures with first supraocular, first superciliary, forming a common median suture separating widely the frontonasal from frontal; latter distinctly longer than its distance from the end of the snout, not more than once and a half times as long as wide, broadly in contact with three supraoculars, wider than the supraocular region; frontoparietals relatively large, larger than prefrontals, forming a suture one third the length of the interparietal; latter much longer than wide, not enclosed by the parietals, which are large, their greatest length more than twice their greatest width.

Nasal very distinctly divided, the anterior and posterior parts of about equal area; no postnasal; anterior loreal large, not higher than posterior loreal, their upper and lower edges forming practically parallel lines anteriorly; posterior loreal trapezoidal; two

presuboculars, the anterior much the larger; a small quadrangular preocular; seven superciliaries, the anterior largest; four postsuboculars; seven upper labials, four anterior to the subocular, of which the third is largest; seventh labial about once and a half the area of the sixth, forming a broad suture with the upper secondary temporal; the single primary temporal is rectangular, less than one third the size of the upper secondary but about two thirds the size of the lower secondary; tertiary temporal narrow, entering ear; the seventh labial followed by an elongate postlabial which enters the ear; above this another smaller scale; two preauricular lobules; five lower labials, last largest and followed by an elongate scale; mental has same extent as rostral on labial border; postmental single, wide; three pairs of chinshields, the second widest; the third chinshield followed by two scales, a postgenial elongated longitudinally, and a scale bordering the inner margin of the postgenial, which is much wider than long; lower eyelid with four enlarged opaque scales, separated from the subocular by (usually) three series of small scales; most of the palpebral scales form sutures with superciliaries; two well-developed pairs of nuchals, the anterior much the largest; 28 scales around neck behind the ear; 25 around more constricted part of the neck; 30 scales behind arm, and 24 rows around middle of body; 14 about tail just posterior to anus; six scales border the anus anteriorly, median pair enlarged, with two smaller scales on each side, the outer overlapping the inner; subcaudal scales widened, 80 from anus to tip (the last seven are regenerated but differ but little from other scales); the median series of scales on back are slightly wider than the lateral scales; usually two or three minute pits on the scales on sides of neck and on anterior part of body; on the posthumeral and postfemoral region the pits are usually more numerous.

The limbs are short and frail; when adpressed they fail to meet; lamellar formula of fingers: 5; 8; 10; 10; 5; of toe 5; 9; 11; 14; 7; a fairly well-developed wrist tubercle; palm with scattered larger tubercles, the largest at the base of the inner toe; terminal lamellae (scales) not tightly bound about claws; sole of foot short, the heel with four plates; scales about ear, 14; scales from occiput to above anus, 61.

Color. Above generally bronze-brown, each scale with a somewhat darker area, but not forming distinct dark lines; head dark black-brown; dorsolateral line of a light yellowish-brown begins on the rostral, follows sides of head, then passes onto the second

Measurements of *Eumeces brevirostris* (Günther)

Museum Number Sex	A.M.N.H. 19270 yg.	U.S.N.M. 39098 ♀	E.H.T. 1688 ♂	M.N.H.P. ..... ?	U.S.N.M. 46682 ♂	U.S.N.M. 30089 ♀	Brit. M. Type ?	U.S.N.M. 30213 ♀
Total length	.....	121	.....	127	156	.....	161	.....
Snout to vent	42	52	53	56	64	64	66	70
Snout to foreleg	15.2	16	18	.....	21	20	.....	21.8
Snout to ear	8.6	10	10	9	11.2	11.4	.....	.....
Snout to eye	3 4	3.8	4	.....	4	4.1	.....	4.5
Tail	.....	69*	.....	71	92	.....	95	.....
Length of head	7.6	9.3	9	9	11	10.2	12	11
Width of head	7	8	8	8	9	8.3	9	9.2
Width of body	8	10	11	.....	11.5	12.6	.....	12.5
Anal tail width	.....	5	6.5	.....	7	6	.....	7.2
Foreleg	11	12	12	13	14	15	15	15.6
Hind leg	14.5	17.5	16	18	19	20	21	20.4
Longest toe	4.2	6.5	6	.....	6.5	7.5	.....	7.3
Axilla to groin	23	32	21	.....	39	40	.....	43

* Regenerated. (Nos. 30213 and 39098, Orizaba, V. C. Others are from Oaxaca.)

scale row, later involving the edges of second and third and then onto the third row where it continues to the tail, covering about two thirds the width of a single scale row; below this a brown stripe begins on nasal, follows back along head involving eye and upper part of ear, continuing along the sides to the base of the tail; this is about two and one half scales wide; it is bordered below by a light line beginning near the tip of snout which follows lower edge of the labials, then curves up slightly over the posterior part of the labials, leaving a dark area along the lower edge; it involves the lower third of the ear, then passes along the side of body and base of tail, interrupted by insertion of hind leg; below this a narrow brownish line, about same color as the deep lateral brown stripe; below this the scales are ash to silver gray with darker brown areas on the adjoining row; chin lighter, but flecked with gray; under side of tail brownish; limbs brown, with some silver flecks; toes with silver blotches on each dorsal lamella; median preanal scales light. (Tail blue in young.)

Measurements of *Eumeces brevirostris* Günther (Totalco V. C.)

Collection	T.-S.	T.-S.	T.-S.	T.-S.	T.-S.	T.-S.	T.-S.	T.-S.	T.-S.	T.-S.
Number	2586	2588	2584	2589	2583	2580	2581	2575	2577	2574
Sex	yg.	yg.	yg.	yg.	?	♀	♂	♀	♀	♀
Total length	67	.....	74.5	87.5	122	.....	.....	.....	.....	144
Snout to vent	28	31	31.5	35	50	53	53	56	56	58
Snout to foreleg	10.2	11	11	12	15.7	16	15.5	17	16	16.7
Tail	39	.....	43	52.5	72	.....	.....	.....	.....	86
Length of head	5.2	6	5.8	5.8	7.3	7.4	8	8	8.3	8.2
Width of head	4.3	5	5	5	7	7	7.3	7.2	7.8	7.2
Width of body	4.2	5	5	5.2	7.3	8	7.2	8.8	8	7.2
Anal tail width	2.6	3	3	3	5	4.8	5	5	5	5.2
Foreleg	6.4	7.5	6.4	6.8	11	11	11	11	11	11
Hind leg	9	9.8	10	10.3	15	15.2	16	15.8	15	16.2
Longest toe	3.8	4.3	4	4	5.7	5.6	5.4	5.4	5.7	5.8
Axilla to groin	16	16	16	18.5	31	33	31.2	33	34	35.2

Variation: Specimens occurring in various localities in Mexico differ rather distinctly from the typical form. Unfortunately large series are wanting from all known localities except Totalco, V. C., from which place a series of 19 specimens is available. When sufficient material is at hand it is highly probable that certain of

these will profitably be separated as species or subspecies. With limited material it seems unwise to do so.

The following key will show the variation from the typical form:

A. Interparietal not enclosed by parietals.

B. Interparietal not in contact with the frontal; frontal wider than supraocular region.

C. Larger (maximum size 70 mm.); dorsolateral and lateral lines distinct or more or less obscured posteriorly; dorsolateral lines separated by four scale rows and edges of adjacent rows; lateral brown stripe about width of two and one half scale rows; 24 scale rows. Oaxaca specimens, typical.

CC. Smaller (maximum size 58 mm.).

D. Lateral line from third labial passes through ear, involving all but upper edge; dorsolateral line becoming dimmer and tending to widen to the second scale row rather than to fourth, and is then separated from its fellow by less than four scale rows; 22–24 scale rows. Totalco, V. C. (19 specimens).

DD. Either lower secondary temporal or tertiary temporal wanting; lateral line on posterior labials not distinct beyond ear, and involving only part of lower edge; dorsolateral line less than one scale row wide, separated by four whole rows, and edges of adjacent rows; lateral brown stripe covering width of two and one half scale rows. Traces of darker lines low on sides producing the effect of dotted lighter lines. Specimen from Jalisco (La Cumbre de los Arrastrados, Talpa, Mascota) (1 examined).

BB. Frontal and interparietal in contact; the frontal distinctly narrower than the supraocular region; dorsolateral stripes very distinct on body and on one third of tail, following the second and third scale rows, separated by two whole and two half scale rows; lateral line from snout to foreleg, involving only lower edge of ear; 24 scale rows. Specimen, Ruma Hidalgo, Oaxaca (A.M.N.H. No. 19270).

AA. Interparietal inclosed by parietals; 24 scale rows; dorsolateral line nearly one and one half scale rows wide and separated throughout by four scale rows and edges of adjoining rows; lateral brown stripe about width of one and one half scale rows, covering all the fifth row and edges of the adjoining rows; lateral line wide on posterior labials, involving three fourths of ear, and is fairly distinct as far as the forearm, but on side is very dim or lost in ventrolateral coloration. (Primary temporal fused to upper secondary in one specimen.) Tertiary temporal absent. Specimens, Coyote, Durango (Field 3); Sierra de Juanacatlan, La Laguna, Jalisco (U.S.N.M. 1).

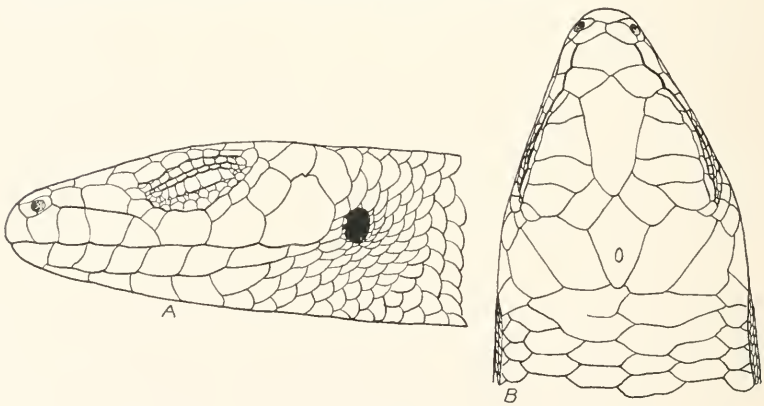

FIG. 77. *Eumeces brevirostris* (Günther). A.M.N.H. No. 19270, Oaxaca. A, lateral view of head; B, dorsal view of head. Actual head length, 7.6 mm.; width, 7 mm.

From the table of measurements and the key, it will be noted that the specimens from the more southern localities are somewhat larger, and have slightly longer limbs. In the series of 19 specimens collected by Hobart Smith and myself at Totalco, Vera Cruz, the largest specimen measures only 58.5 millimeters.

The variation in scalation observed in the series of 23 specimens examined is as follows: Scale rows about neck behind ear, 27 to 29; about narrow part of the neck, 23 to 26, the numbers 26 and 25 about equal, each of the lesser numbers appearing once; scales around the middle of body, 22 to 24, the number 22 occurring six times, 23, four times and 24, thirteen times; scales from parietals to above anus, 57 to 63, the number 59, twice, 60, three times, 61, three times, 62, nine times, 63, six times. Upper labials 7-7, save one with 6-7; the scales about the ear are usually 15, the number occurring in 8 specimens on both sides, and 15-14 occurring 13 times. One specimen had 15-16, another 14-13. No variation is observable in the supraoculars and postmental; the postnasal is invariably absent; the superciliaries are usually six or seven, the higher number appearing most frequently.

A single specimen has an abnormally small interparietal, permitting the parietals to form a union behind it. The frontonasal is invariably broader than long, touching the first loreal. The frontonasal forms a suture with the frontal in four cases; in 19 they are separated by the junction of the prefrontals; three supraoculars touch the frontal in all save three specimens, and in those, third excluded by a minute distance. The lamellae under the fourth toe vary between 11 and 14, the number 11 occurring 5 times; 12, eighteen times; 13, thirteen times, and 14, ten times; presuboculars two; postsuboculars three to five, three occurring 27 times; four, 15 times; five, once. The lower secondary temporal is occasionally wanting (fused with the tertiary). Occasionally the tertiary is separated from the nuchal by a small scale.

Remarks. The specimens from near Totalco, V. C., were obtained near the highway in a barren field, covered in part by an old lava flow. The specimens were found under lava rock. They appeared to be very numerous in this locality, as the series of 19 was obtained in about three hours' collecting. Many that were seen escaped. No other species of *Eumeces* was obtained in this locality.

One of the specimens in the U. S. National Museum, No. 30213, contains disintegrating eggs, with partially developed embryos.

The uterine walls have rotted and the eggs with the embryos are loose in the body cavity. The embryos show no pigmentation. A second specimen, U.S.N.M., No. 30089, has four much older embryos, 26 mm. in length, which show some markings. Here, too, the uterine walls have rotted and the young are floating in the semiliquid yolk mass in the body cavity.

Distribution. As here considered the species ranges from Durango and Jalisco to the south and east, reaching to Vera Cruz and Oaxaca. It appears to be confined largely if not wholly to the high plateau region.

Certain specimens in foreign museums have not been studied; nor have I included the locality records since it seems likely that more than one recognized species is identified under that name. (See Fig. 76 for distributional map.)

Locality records:

OAXACA: "Oaxaca" (type locality; type Brit. M. 1, Sallé Coll.); (Bocourt, M.H.N.P. 1, Sallé) (M.N.H.P. 2); La Parada (U.S.N.M. 1, Nelson and Goldman Coll.); Tehuantepec (U.S.N.M. 2, Sumichrast Coll.).

VERA CRUZ: Orizaba (U.S.N.M. 2, Sumichrast Coll.); Totalco (Taylor-Smith 19, Taylor-Smith Coll.).

DURANGO: Coyote (Field 3).

JALISCO: La Cumbre de los Arrastrados, Talpa, Mascota (Brit. Mus. 6, Buller Coll.) (Senckb. 4, Buller Coll.) (Taylor 1, Buller Coll.); Sierra de Juanocatlan, La Laguna (U.S.N.M. 1).

Eumeces indubitus Taylor

(Plate 42; Figs. 76, 78)

SYNONYMY

1933. *Eumeces indubitus* Taylor. Univ. Kansas Sci. Bull., XXI, 1933, pp. 257-267, pls. 24, 25, fig. (type description; type locality, Mexico-Cuernavaca highway, 40 miles southeast Mexico City [kilometer 63], near Cuernavaca, Morelos).

History. The specimens on which this species is based were collected in pine forest in the high mountains between Mexico City and Cuernavaca, July 9, 1932, at an elevation of about 10,000 feet. The species was again encountered August 5 and 6, 1932, in western Mexico (state), near Asunción, in pine forest at an elevation of about 9,000 feet, and in the state of Michoacán near Zitácuaro, in a similar habitat. The specimens seemed very common in the pine forest, but the distribution was not uniform, as no specimens were found in several similar, near-by localities. In one near-by place it was apparently wholly replaced by *copei.*

Diagnosis. A medium-sized, robust species; four supraoculars, the three anterior in contact with the frontal; the parietals enclosing

a small interparietal; one postmental; no postnasal; the subcaudals distinctly widened; seven upper labials; seven superciliaries; the seventh upper labial broadly in contact with the upper secondary temporal; primary temporal small, widely separated from the small lower secondary; 24 scale rows about middle of body; 57 to 61 scales from occiput to above anus. Limbs moderately large, but failing to touch, even in young, when adpressed. Color above, olive to olive-brown, with a short dorsolateral light line from rostral, the line disappearing on the shoulder; a narrow labial light line terminating at ear; no median light line or forking lines on the head; no lateral line beyond ear.

Description of the type (adult male). Portion of rostral visible above equal to about half the size of the frontonasal; supranasals large, broadly in contact; frontonasal hexagonal, forming sutures with loreals, and narrowly in contact with the frontal, forming its longest sutures with prefrontals; latter narrowly separated, forming sutures with first superciliary, both loreals and the anterior supraocular; frontal longer than its distance from the end of the snout, obtusely angular anteriorly, somewhat rounded posteriorly, somewhat narrowed in the middle, and only a little wider in the anterior part than in the posterior; four supraoculars, the first longer than wide, with an area scarcely less than the fourth, the three anterior bordering the frontal; frontoparietals much larger than prefrontals, their common suture less than half their length; interparietal short and broad, enclosed behind by the parietals, which are more than twice as long as their greatest width; two pairs of nuchals, the anterior pair somewhat the larger.

Nasal of moderate size, divided, the anterior part not as large as the posterior part with nostril; anterior loreal distinctly higher than long, higher than the posterior, which is considerably longer than high; seven superciliaries, the anterior less than one and one half times the size of the second; two subequal presuboculars; four postsuboculars; primary temporal less than one fourth the size of the upper secondary temporal; latter very broadly in contact with the seventh labial, the suture more than half its length; seven upper labials, four preceding the subocular, which is low and elongate; seventh nearly double the size of the sixth, and separated from the ear by a pair of small postlabials; tertiary temporal (the lower secondary presumably wanting) small; ear surrounded by 16 scales; the ear opening no larger than the first upper labial; six lower labials, the last elongate; mental large, deep, with a distinctly

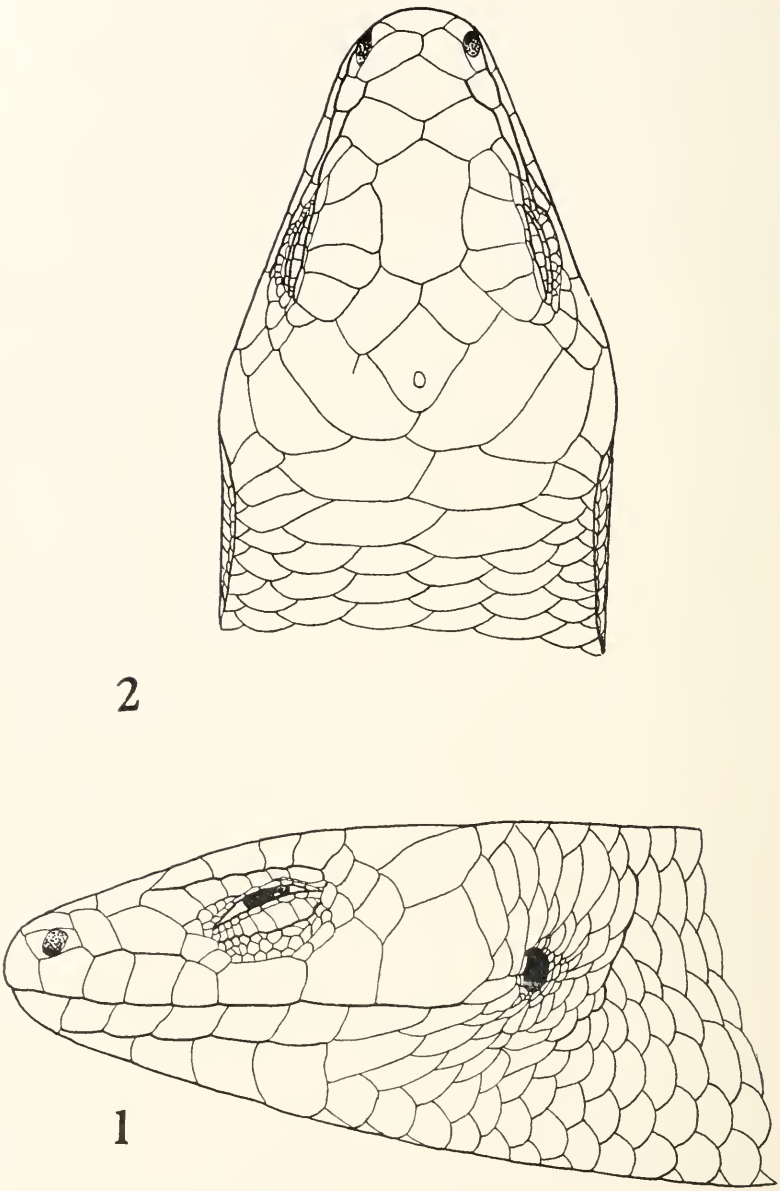

FIG. 78. *Eumeces indubitus* Taylor. E.H.T. and H.M.S. No. 1727. (1) Lateral view of head; (2) dorsal view of head. Actual head length, 10 mm. (Certain differences in scalation from the type shown.)

larger labial border than rostral; one azygous postmental; three pairs of chinshields, only one pair in contact; the postgenial large, bordered on its anterior inner edge by a scale wider than long; eye small; the lower eyelid with four or five enlarged opaque scales, separated from the suboculars by at least three rows of granules; two or three median palpebral scales directly in contact with superciliaries, others separated by small granular scales.

Scales on the dorsal surface and sides about equal in size; 24 rows about the middle of the body; 29 rows about neck behind ear; 30 about the constricted portion of the neck; 30 about body in axillary region; 15 rows about the base of the tail; 57 scales from occiput to above the anus; scales under the tail two and one half to three times as broad as long; median preanal scales large, broad, with two small, scarcely differentiated scales on each side, the outer scales overlapping inner; lateral postanal scale not or scarcely differentiated; scales behind ear, about insertion of arm and in axillary region, on posterior side of femur, behind insertion of hind limbs, and along side of anus, with distinct pits; two small auricular lobules.

Legs moderately large, separated when adpressed by a length of three or four scales; a very small area of granular, axillary scales; wrist tubercle flat, well differentiated; several larger rounded tubercles on palm, mixed with smaller tubercles; lamellar formula for fingers: 5; 8; 11; 10; 7. Heel bounded by five large, flattened, tubercular scales, contiguous with or overlapping one or two differentiated tubercles on sole; lamellar formula for toes: 5; 9; 11; 13; 9. Terminal lamellae (scales) on toes not tightly bound about claws; no intercalated series of scales along the side of the fourth toe.

Color in life. Above, light olive-brown, the head somewhat darker brown; darker flecks in the median part of each scale, more prominent posteriorly and tending to form dotted darker lines; a dorsolateral light line bordered on its inner edge with darker, begins on rostral and continues on the side of the head and neck but loses its identity on the shoulder; the two median scale rows are a shade darker than the two adjoining rows on each side; beginning on the side of the head is a dark blackish-brown stripe, the color not uniform, each scale with light bronze areas, the black concentrated on the anterior part of the scale and tending to form an indistinct line on each scale row; a cream line beginning on the rostral passes along the lower edge of the first four labials, and through the middle of

the last three, the edges of the line clearly demarcated, terminating in the lower anterior corner of the ear; below the dark lateral stripe the ground color is grayish and the scales have darker areas forming two or three very indistinct dotted lines; lower labials light, bordered with darker; chin, lower side of neck and breast, light, a few of the scales with darker flecks; hind legs darker than forelegs, each scale with lighter flecking; tail bluish-gray above, lavender-blue below; lamellae under toes dark.

Variation. The table, giving data from a part of the series available, shows the principal variation of this species as regards measurements and scale variation.

The number of scale rows is 24 save in two cases where there are but 22 rows; the number of upper labials is constantly seven; one specimen shows the third and fourth partially fused on one side. Only a single specimen shows the parietals separated, and this only

Measurements and scale counts of *Eumeces indubitus* Taylor

Number	3593	1731	1671	1725	1728	1673	3598	1697	3600	1724	1696
Sex	♂	♂	♀	♂	♀	♂	♀	♀	♀	yg.	yg.
Snout to vent	66	64	62	64	64	63.5	58	54	41	37	32
Tail	108	.....	.....	105	.....	.....	.....	.....	66	57	47
Snout to fore limb	22	20.5	19	20	18	20	18	19	14	13	12
Axilla to groin	37	36	38	40	43	39	34	31	28	23	19
Width of head	11	10.8	10	10	9	9.8	8.4	8.2	.....	7	6
Length of head	12	10.8	9.5	10	9.3	9.5	8.6	9.1	.....	7	7
Width of body	13	12	12	13	12	12	10	10	8	7	6
Foreleg	15	13	12.2	12	12	14	11	12	9.5	8.5	8
Hind leg	20.2	19	17	18	18	19	15	15	12	11	10
Scale rows, body	24	24	24	24	24	24	24	24	24	22	22
Scales occiput to above anus	57	56	59	59	61	60	59	58	59	59	59
Upper labials	7	7	7	7	7	7	7	7	7	7	7
Supraoculars	4	4	4	4	4	4	4	4	4	4	4
Nuchals pairs	2	2	2	3	2	2	2	2	2½	2	2
Postmentals	1	1	1	1	1	1	1	1	1	1	1
Postnasals	0	0	0	0	0	0	0	0	0	0	0
Largest labial	7	7	7	7	7	7	7	7	7	7	7
Frontonsal touch frontal	yes	yes	yes	no	no	no	yes	no	yes	no	no
Seventh labial touch upper sec. temporal	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Supraoculars touch frontal	3	3	3	3	3	3	3	3	3	3	3–2

very narrowly. Scales about the ear vary from 15 to 18; the numbers 15 and 16 are common; the higher numbers rarely occur. The scales from occiput to above anus vary from 57 to 61, 59 being twice as frequent as the other numbers. One postmental and no postnasal seem to be invariable characters. The seventh labial is invariably the largest, frequently double the size of the sixth; subdigital lamellae under fourth toe, 11-14, 12 and 13 being the most usual numbers. The number of the supraoculars is invariable. The temporals are surprisingly stable in character.

The ground color varies in shade from darker to lighter. In younger specimens the color on the dark lateral stripe may be uniformly black. The character of the light lines does not vary, and is identical in the very young (31 mm.) and adults. In the young the tail is a bright blue, and this color is usually retained by the adults, but with blackish or gray flecks breaking the uniformity. The head in the young is never black. The dotted dark lines on dorsal scales are more distinct in some specimens than in others.

Remarks. The relationship of this species is with *Eumeces dugesii*, despite the very striking difference in the character of the scales of the top of the head. It shows a parallel development with that which has taken place in the *Lynxe* group. *Furcirostris* with three supraoculars stands to *lynxe* as *dugesii* does to *indubitus*. However, it appears that in the two latter, the differential characters have become completely stabilized.

This new form may readily be separated from *Eumeces dugesii* by the character of four supraoculars, three touching the frontal, instead of three supraoculars, with only two touching the frontal. The contrast of color between the dorsal surface and the sides is much more pronounced in *dugesii* than in *indubitus;* the former often becomes yellowish-bronze, and even silvery above. In all the specimens examined, thirty-three in all, there is no evidence that the characters separating the two forms overlap or intergrade in any manner.

The species is more distantly related to *Eumeces brevirostris* Günther as suggested by the presence of a large seventh labial which makes a suture with the upper secondary temporal.

So far as is known, it is a high mountain form, as all specimens taken were found in the mountains in pine forest, under rocks or logs.

The food of this species, judged by stomach contents, consists wholly of small insects. An examination of the reproductive organs

gave no clue as to whether the form is oviparous or ovoviviparous, since neither the ovaries nor uteri contained developing eggs. It is highly probable, however, that this, like its close relative, *dugesii*, is ovoviviparous.

A single paratype (No. 1672) was presented to the Instituto de Biologia in Mexico City.

Distribution. The present known distribution includes the states of Morelos, Mexico, and eastern Michoacán in the high mountains, probably largely confined to the pine region in the high mountains at elevations of 8,000 to 12,000 feet. (See Fig. 76 for distributional map.)

Locality records:

Morelos: Near Cuernavaca (kilometer 63), Mexico City-Cuernavaca highway (type locality, Taylor-Smith Coll. 10) (Inst. Biol. 1).

Mexico: Near Asunción, western Mexico (Taylor-Smith Coll. 20).

Michoacan: 15 miles southeast of Zitácuaro, eastern Michoacán (Taylor-Smith 2).

Eumeces dugesii Thominot

(Plate 43; Figs. 76, 79)

SYNONYMY

1883. *Eumeces* (*Plestiodon*) *Dugesii* Thominot. Bull. Soc. Philo. de Paris, (7), VII, (1882-1883), 1883, pp. 138, 139 (type description; type locality, "Province Guanajuato" [Mexico], collected by A. Dugès); Dugès, La Naturaleza, VI, (1882-1884), Nov. 4, 1883, pp. 361, 362, lam. 9, figs. 1-7 (r. description of the species from other material from type locality; full-length figure, hand colored); Cope, Proc. Amer. Phil. Soc., XXII, Jan. to Oct., 1885, pp. 167-194 (key characters); Günther, Biol. Cent.-Amer., Oct., 1885, p. 32; Cope, Bull. U. S. Nat. Mus., No. 32, 1887, p. 46 (gives Michoacán, and Zacualtapan [Morelos] as localities); Dugès, La Naturaleza, (2), II, 1894, p. 485; ? Herrera, Cat. Col. Rept. Batr. Mus. Nac., 1895, p. 24, Apatzingan, Michoacán; and Ed. 2d, 1904, p. 24; Cope, Ann. Rept. U. S. Nat. Mus., 1898, (1900), p. 630 (Key).

1887. *Eumeces brevirostris* (part.) Boulenger. Cat. Liz. Brit. Mus., 1887, p. 379.

?1900. *Eumeces triaspis* Cope. Ann. Rept. U. S. Nat. Mus., 1898, (1900), p. 1232 (*Nomen nudum*).

History. This form was first discovered by Alfredo Dugès in Guanajuato, in 1882 or 1883. One specimen was sent to the Paris Museum, and in 1883 it was made the type of a new species named *dugesii* in honor of its discoverer. In the same year, Nov., 1883, Dugès published a description of the species under the same name (attributing the name to Thominot), but stating that he had not seen the type description. He published a plate (hand colored), giving a full-length dorsal view, and several figures, all of which are rather inaccurate. In this paper, Dugès recorded the fact that the species is "viviparous." The contribution is based on other than the type material. I have examined the specimens, three from Tangancíquaro and Patamban, collected by Dr. Octavius Navarro,

and now a part of the Alfredo Dugès Museum Collection, in Guanajuato, Guanajuato, Mexico.

Boulenger (1887) placed the species as a synonym of *Eumeces brevirostris* Günther. Cope (1900), however, failed to follow this disposition of the form, but continued to recognize it as a distinct species. In this same work he published the name *Eumeces triaspis* as an inhabitant of the "*Austroccidental*" district, a district including the range of this species. It appears to be a *nomen nudum*, since I can discover no evidence that such a name with description was ever previously published. The name *triaspis* (three shields) is presumably suggested by the three supraocular scales. The other species having the three shields is *furcirostris* and this is listed on the preceding page; *dugesii* is omitted; so it would appear that this species was intended. Two specimens of the species are in the United States National Museum.

Careful drawings of a specimen from Stanford University, together with drawings of other related Mexican species, were sent to Dr. F. Angel, Museum d'Histoire Naturelle, Paris, for comparison with the type. Concerning the drawing of the Stanford Museum specimen, he states that the figure corresponds exactly to the characters of *Eumeces dugesii* Thominot, the only difference being that the type of *dugesii* has two pairs of nuchals instead of three. (In the drawing sent there are three nuchals on one side; on the other the third scale is partially segmented.)

Diagnosis. A medium-sized species characterized by dorsolateral light lines, tending to become obsolete in adults, and the absence of a median line or bifurcating lines on the middle of head. Three supraocular scales, the two anterior broadly in contact with the frontal; the interparietal broad, with the parietals forming a broad suture behind it; two pairs of nuchals (normally), the anterior pair larger; a small primary temporal, separated from the lower secondary temporal by the greatly enlarged seventh labial, which forms a suture with the upper secondary temporal; a member of the *Brevirostris* group. The species is ovoviviparous.

Description of species (from No. 26154 U. S. Nat. Mus. Collected by Dugès, Guanajuato, Mexico). The portion of the rostral visible above of moderate size, forming a very obtuse angle; supranasals elongate, diagonal, twice as long as wide, forming a common suture less than their width in length; frontonasal wider than long, touching loreal (on one side abnormally separated from loreal); prefrontals large, making equal sutures with the two loreals, and

forming a very short, common suture medially, separating frontal from frontonasal; frontal very large anteriorly, broadly in contact with the anterior superciliary (perhaps abnormally); three supraoculars, the anterior large, triangular, the two anterior forming sutures with the frontal; frontoparietals about the size of the prefrontals, forming a moderate median suture; interparietal small, distinctly less than half the length of the frontal; parietals large, broad, forming a considerable suture behind interparietal; two pairs of large nuchals; nasal very small, divided, the suture with the first labial longer than that with the rostral; nostril directed strongly forward; no postnasal; two loreals; the anterior but very little

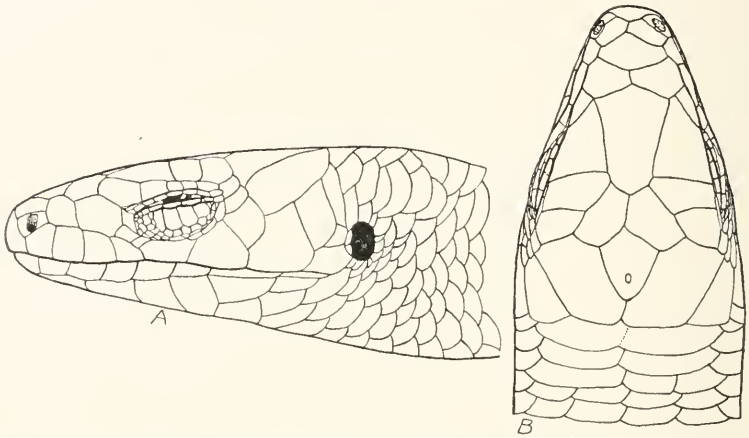

FIG. 79. *Eumeces dugesii* Thominot. Stanford U. No. 3842; Michoacán, Mexico. A, lateral view of head; B, dorsal view of head. Actual head length, 6.5 mm.; width, 5.5 mm. Young.

higher than posterior; latter generally rectangular, but little longer than high, narrowly in contact with second labial, but in contact the entire length of third; five or six superciliaries, anterior largest; two small postoculars; a small primary temporal, separated from the small lower secondary temporal by the suture of the seventh labial with the large upper secondary temporal; the tertiary temporal is small, elongate, very narrowly separated from the auricular lobules.

Seven upper labials, the fourth smallest, the last much the largest; the subocular labial is low, only slightly higher than second or third; palpebral series largely in contact with superciliaries; four rather large plates on lower eyelid, separated from the subocular by two irregular rows of granules; five lower labials anterior to large posterior, which is followed by a smaller scale hidden under seventh

upper labial; seventh upper labial separated from ear by two small postlabials and a single very small scale; mental relatively small, its labial border of scarcely greater extent than that of rostral; postmental single, somewhat rounded anteriorly; three typical pairs of chinshields, the anterior pair forming a broad suture, the second pair separated by a single pair of scales; last pair followed by an elongate postgenial scale which is bordered on its anterior medial border by a scale wider than long.

Eye small, the diameter of orbit less than its distance from the nostril; ear small, nearly round, with two distinct lobules; ear surrounded by about 15 scales; median scale rows on neck wider than on back; 30 scale rows around the neck behind ear; 24 on narrow part of neck; 30 about body behind arm; 24 about middle of body; scales larger dorsally than ventrally or laterally; the axillary series are dropped out at a distance from axilla not exceeding length of arm to wrist; limbs moderately well developed, when adpressed separated by about 5 millimeters; palm with numerous (about 8) large, rounded tubercles, with numerous other smaller granules; four large heel plates, all in contact; sole with scattered large granules and numerous small ones; 12 lamellae under longest toe; dorsal and ventral lamellae of toes in contact, without intervening scales save occasionally at base; anus bordered anteriorly by six scales; the median preanals well differentiated, much wider than long; the outer preanal scales overlapping inner; lateral postanal scale somewhat enlarged in males, but otherwise not differentiated; scales bordering anus behind strongly pigmented; subcaudal series much widened (especially large on regenerated portion); no small granular scutes posterior to the insertion of hind limb; a few small granular scales in axilla.

Color. Above on head and body, gray-olive, the head slightly brownish; the dorsolateral line begins on the tip of rostral, passes to neck on the second scale row; it shortly begins to encroach on the third row and after passing shoulder occupies the third row entirely; posteriorly the upper edges of the fourth row are involved; the line becomes gradually dimmer posteriorly and can be distinguished from the ground color with difficulty; a brown line begins on side of snout, passes through eye, along side of neck and side of the body; the brown color is not solid, but the scales are rather uniformly flecked with the grayish ground color; this color extends on tail as far as the regenerated part; a lateral light line begins on snout and passes over labials and through the lower edge of the

ear to above arm, where it becomes dim or obsolete on the side; below this, each scale, of the next four or five rows, with a darker area, these forming indistinct, dotted, brown lines; these, low on side, gradually merge into the general drab-slate ventral coloration, the scales of which show some darker areas, and form very indistinct lines. The labials, both upper and lower, show brown markings; the sutures of the lower labials are almost entirely brown; chin-shields creamy-gray, with numerous brown spots along sutures; arms and legs dark brown, heavily flecked with silver-gray; fingers and toes more or less barred with same color; unregenerated portion of tail with larger dark areas on scales, those on side very large and strongly pronounced, those on underside more distinct than dorsally; preanals only slightly lighter than ventral abdominal region.

Measurements of *Eumeces dugesii* Thominot

Museum Number*	Type	U.S.N.M. 26154	U.S.N.M. 26153	Stanford 3842
Snout to vent	65	67	58.6	38
Snout to forelimb		21	19.5	12
Snout to auricular opening		12	9.5	7
Snout to eye		4.3	4	2.8
Eye to nostril		3.5	3.1	2
Head width, greatest	8	9	8	5.5
Head length	9+	10.2	8.6	6.5
Axilla to groin		39	36	20
Foreleg		15.5	12	7
Hind leg		21	16	10.2
Greatest body width		10	9.5	5
Postanal tail width		6	6	3.3
Longest toe		7.2	6	3.5

* The type and Nos. 26154, 26153 are from Guanajuato, Mexico; 3842 is from Michoacán.

Variation. A second specimen (U.S.N.M. No. 26153) has the frontonasal forming a slight suture with the frontal and touching both (instead of a single) loreals; the frontal is proportionally less wide anteriorly and touches only one superciliary. Other dorsal head scales practically the same in shape and proportions, and the lateral head scales, especially those of the temporal region, identical with the described specimen save that the subocular is slightly smaller.

The color above is lighter than the described specimen, bluish or

greenish-gray, from which the dorsolateral line can be distinguished with difficulty on the body, although prominent anteriorly from shoulder to snout; on the head these light lines are edged above by brown lines which continue some distance on the neck; the brown stripe on side of body is less distinct, the brown color forming very indistinct dotted lines; the lateral line from head to arm is very distinct, but very dim or wanting on sides of body; the light areas on the lower labials form distinct rounded spots which are somewhat more distinct than in the described specimen. Scales on the back show very dim darker areas, those of the median rows slightly more pronounced, forming very dim dotted lines from rump onto the tail. The number of scales from the parietals to above the anus is slightly higher (60 as opposed to 56 in the described specimen). The subdigital lamellae are 11-11, instead of 12-12. The limbs are separated when adpressed by a slightly greater distance.

In a young specimen (Stanford No. 3842) the dorsolateral cream line reaches only halfway between head and shoulder, and the lateral line reaches only to the forearm. The limbs in the young are separated when adpressed, by a small distance. Eighty-six widened subcaudal scales on the under surface of the tail (complete). In a young specimen in the Alfredo Dugès Museum, the lateral line appears to continue to near the groin, but the older specimens show the lateral reaching only to the arm.

All the specimens agree on the characters of the supraoculars, temporals, scale rows, labials, and parietals. The frontonasal touches the frontal in one, and is separated in two specimens; in one specimen on one side the first loreal is excluded from contact with the frontonasal; superciliaries, 6-6 or 6-5.

Remarks. As observed elsewhere, this species is closely related to *indubitus*, from which it differs only in the details of coloration and the presence of three instead of four supraoculars. There is no evidence that the territories occupied by these forms overlap.

As pointed out by Dugès (1885) this species is ovoviviparous ("viviparous"). Little else than this is known of the habits of the species.

Distribution. The species is certainly known to occur in the states of Michoacán and Guanajuato. Dugès' record for Chiapas may be questioned. It is a high mountain form, and probably does not occur in the lowland part of Michoacán. (See Fig. 76 for distributional map.)

Locality records:

GUANAJUATO: "Province de Guanajuato (Mexique)" (M.H.N.P. 1, type); Guanajuato, Mexico (U.S.N.M. 2, Dugès Coll.).

MICHOACAN: Michoacán (Stanford 1, Dugès Coll.); "Tanganzíquaro et Patamban" (Alfredo Dugès Mus. 3, Navarro Coll.).

Uncertain or questionable localities: Chiapas (Dugès, 1894); Zacualtipan (Cope, 1887).

Eumeces colimensis Taylor

(Plate 40, Fig. 3; Figs. 76, 80)

SYNONYMY

1935. *Eumeces colimensis* Taylor. Field Mus. Nat. Hist., Zoöl. Ser., XX, May 15, 1935, pp. 77-80, fig. 7.

Diagnosis. A medium-sized species belonging to the *Brevirostris* group, characterized by broad dorsolateral light lines originating on the rostral and continuing to tail, and a lateral light line, probably distinct in young but dim or obsolete in adult; no median line and no bifurcating lines on head. One postmental; no postnasal; frontal in contact with interparietal; parietals enclosing the interparietal; seven upper labials, last the largest, forming a suture with the upper secondary temporal; primary temporal wanting (possibly abnormally fused with the upper secondary); lower secondary and tertiary temporals present; ear of normal size; limbs well developed, strongly overlapping when adpressed.

Description of type (No. 1649, Field Museum of Natural History; Colima, Mexico; collector unknown; adult female). Portion of the rostral visible above small, much less than one half the size of the frontoparietal; supranasals large, of much greater length than the nasals, forming a median suture; frontonasal much broader than long, touching laterally the anterior loreal, forming broad sutures posteriorly with the prefrontals, in contact with the frontal at the attenuated anterior end; prefrontals narrowly separated, quadrangular in shape, the side touching frontal the longest, also forming unequal sutures with the frontonasal, second loreal, first supraocular, first loreal and first superciliary, the varying lengths of the sutures in the order named; frontal very long (5 mm.), one and one third times its distance from end of snout, posteriorly narrowed and bluntly pointed, in contact with the interparietal; frontal in contact with the first, second and third supraoculars on the left side, with the second and third only on the right side. Frontoparietals one and one half times as long as broad, separated, their posterior ends forming a notch in the anterior part of the parietals; latter

very broad, strongly truncate behind, enclosing the interparietal, forming a rather narrow mutual suture; interparietal rather narrow, elongate; two pairs of nuchals, the first very broad and deep, the second pair very much smaller.

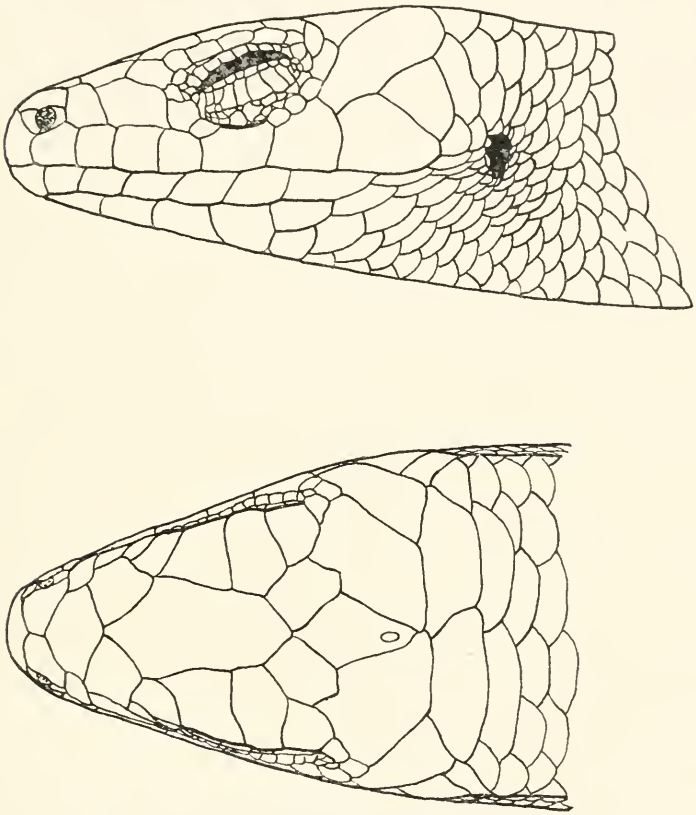

Fig. 80. *Eumeces colimensis* Taylor. F.M.N.H. No. 1649; type, Colima, Colima, Mexico. A, lateral view of head; B, dorsal view of head. Actual head length, 10.7 mm.; width, 9.7 mm. [Courtesy, Field Museum of Natural History.]

Nasal distinctly divided, the nostril behind the line of the rostrolabial suture; the anterior part of nasal larger than the posterior part; no postnasal; first loreal distinctly higher than the second loreal; latter much longer than high, in contact with the second and third labials; two presuboculars, the anterior much the largest, somewhat pentagonal in shape; four postsuboculars, the upper very large, but not to be mistaken for the missing primary temporal; six superciliaries, anterior the largest, the last next in size; eye small,

distinctly less than its distance from the nostril; three or four median upper palpebral scales forming sutures with the superciliaries; a relatively large, wedge-shaped preocular, followed by a small scale on upper eyelid; two small postsuboculars; four or five large, vertically placed, opaque scales on lower eyelid, separated from the subocular by two irregular rows of tubercular scales, somewhat larger than is typical for the genus. Primary temporal wanting (perhaps fused abnormally with the upper secondary temporal); the upper secondary temporal broadly in contact with the sixth and seventh labials, more than twice as long as its greatest width; lower secondary temporal of moderate size, somewhat fan-shaped; tertiary temporal elongated, not entering ear, but in contact above with the upper secondary. Seven upper labials, four preceding the subocular, of which the first is highest, fourth the smallest; seventh labial largest of the series, but not conspicuously larger than sixth, separated from the ear by two superimposed pairs of postlabial scales, the anterior the largest; two very inconspicuous ear lobules; six well-defined lower labials, the last followed by a smaller scale that may be considered as a seventh. The mental has practically the same extent on the labial border as the rostral; postmental large, single; three typical pairs of chinshields, the third followed by a relatively short postgenial, which is bordered on the anterior mesial side by a scale wider than long.

Scales on back about equal to those of lateral and ventral regions, forming parallel lines, save behind and above arm; postauricular scales relatively large, 18 around ear; 30 scales about neck behind ear; 27 about constricted part of neck; 32 in axillary region; 28 rows about middle of body; 19 at base of tail; subcaudal series distinctly widened; median preanal scales enlarged, with two smaller scales lateral to these, the outer scales overlapping the inner; an elongate scale at each outer posterior corner of the anus, not otherwise differentiated.

Limbs well developed, overlapping the length of the foot with toes when adpressed. A well-developed outer wrist scale; a group of large conical tubercles in middle part of palm; basal lamellae more or less conical; lamellar formula for fingers: 6-9-11-12-8. Three large, thickened, somewhat conical scales at heel; basal lamellae strongly tubercular; two enlarged conical tubercles on sole; lamellar formula of toes: 6-9-13-16-11. Eighteen scales about insertion of hind limb; twelve about insertion of arm. A series of small granular scales in axilla. Lateral nuchal scales usually with

two pits; scales in posthumeral and postfemoral regions, in the postaxillary region and behind the insertion of hind leg with more numerous pits.

Color (specimen apparently somewhat discolored by preservatives). Above brown-olive, each scale with a darker area, forming six indistinct dotted lines; head more brownish, followed by a brownish streak beginning in the nuchal region, continuing back about a centimeter on neck; small darker areas on prefrontals, supraoculars and parietals; no "bifurcating" lines on head and no median stripe; broad dorsolateral light lines, beginning on the snout, continue on sides of head and body to tail, covering parts of the third and fourth scale rows, separated from each other by four whole and two half scale rows; the dark spots on the scales bordering the light stripe more pronounced than elsewhere; a broad labial stripe begins on rostral, follows lower part of labials through lower half of ear; beyond this, it can scarcely be distinguished from the coloration of the side; a broad band of brown beginning anterior to the eye continues along the side to some distance on the tail, covering two whole and two half rows of scales; lower labials, chin, throat and breast cream color; under side of limbs, anal scales and along a median line on subcaudals, lighter; limbs above generally dark brown, with lighter brown areas on the scales, continuing on toes, giving them a slightly cross-barred appearance; abdomen and lower part of sides somewhat lead color (due to preservative), each scale with a darker area.

Measurements of the type of Eumeces colimensis Taylor

	mm.		mm.
Total length	134	Length of head	10.7
Tail (regenerated)	69	Foreleg	18
Snout to foreleg	23.2	Hind leg	26
Snout to ear	13.5	Longest toe	11
Snout to eye	5	Width of body	11.3
Axilla to groin	33	Snout to vent	65
Width of head	9.7		

Remarks. This species may be differentiated from all other members of this group by the greater development of the limbs, which overlap in the adult a distance equal to the entire length of the foot. In the absence of the primary temporal it agrees with *dicei*, but differs markedly in the character of the lower eyelid, the presence of a lower secondary temporal, and in a much larger size as well as in the greatly increased number of scale rows about the body. Whether the contact between the frontal and interparietal

and the lack of a primary temporal are normal conditions can only be determined when a series of specimens are available for comparison.

So far as I am able to learn, the collector is unknown.

Distribution and locality records. The single specimen known is from Colima (presumably the town), Colima, Mexico. (See fig. 76 for distributional map.)

Eumeces dicei Ruthven and Gaige

(Figs. 76, 81)

SYNONYMY

1933. *Eumeces dicei* Ruthven and Gaige. Occ. Papers Mus. Zoöl. Univ. Michigan, No. 260, Apr. 3, 1933, pp. 1-3 (type description; type locality, Marmolejo, Tamaulipas, Mexico).

History. The species was first discovered at Marmolejo, Tamaulipas, during the first part of the month of August (1-10), 1930, by Dr. Lee R. Dice of the University of Michigan, for whom the species was named. It is known only from the type, which is No. 69253, Museum of Zoölogy, University of Michigan.

Diagnosis. A small species, with a narrow dorsolateral light line, but lacking a lateral line and a median line bifurcating on the head; no primary temporal; no lower secondary temporal; tertiary temporal present; sixth and seventh upper labials much enlarged, forming sutures with the large, upper secondary temporal; four supraoculars, three broadly in contact with the frontal; first labial much larger than the three succeeding labials; no postnasal; one postmental; scales in 22 rows about the middle of the body; parietals not enclosing the interparietal.

Description of the type. Body slender, the habitus similar to *Eumeces egregius;* head rather elongate, narrow on top; rostral moderately large, separated from frontonasal by the supranasals; frontonasal about as long as broad, separated from the frontal by a minute distance, but in contact narrowly with the anterior loreal; prefrontals large, pentagonal, in contact mesially at a single point, touching two loreals, the first superciliary and the first supraocular; frontal sharply pointed anteriorly, peculiar in being constricted just posterior to the middle, behind which it widens, forming a lateral angle, rounded posteriorly; frontoparietals generally rectangular, forming a moderate median suture about one third their length; interparietal slightly shorter than the frontal, but nearly as wide at the widest point, not enclosed by the parietals; latter large, bordered on the side by the elongate upper secondary temporal and the largest, most posterior of the postsuboculars; two pairs of well-differ-

entiated nuchals; four supraoculars, the first and last of about equal size, the third forming an angle between the frontal and the frontoparietal; nasal divided, the anterior moiety larger than the superficial part of the posterior; nostril pierced behind the rostro-labial suture; no postnasal; anterior loreal very distinctly higher than the posterior, higher than wide; posterior loreal relatively small, equal to or of only slightly greater surface area than anterior, distinctly longer than high, bordering second and third labials; seven superciliaries, first not greatly larger than the second; two presuboculars; three postsuboculars, the posterior very large proportionally; eye

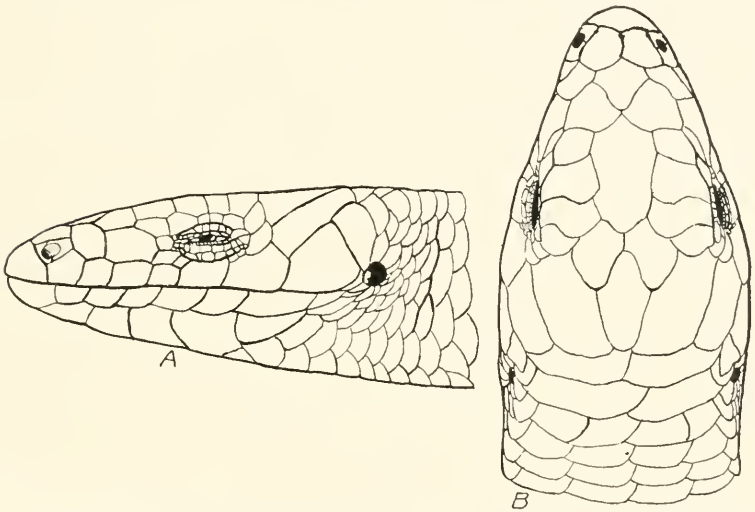

Fig. 81. *Eumeces dicei* Ruthven and Gaige. Mich. U. No. 69253; Marmolejo, Tamaulipas, Mexico. A, lateral view of head; B, dorsal view of head. Actual head length, 6.5 mm.; width, 5.5 mm.

small, the long axis of the orbit less than its distance from the nostril; two tiny postoculars; one small preocular; medial palpebrals touching superciliaries; anterior and posterior palpebrals separated from superciliaries by small intercalated granules; lower eyelid with the upper series of plates not or scarcely larger than some in the second row; only two rows between lower palpebrals and the subocular. Primary temporal absent (or fused completely with the upper secondary); lower secondary temporal absent; tertiary temporal proportionally larger than usual in the genus, entering auricular opening. Seven upper labials, the sixth smaller than the greatly enlarged seventh, but both forming sutures with the upper secondary temporal; four labials preceding the subocular labial, of

which the first is distinctly the largest; seventh labial separated from the auricular opening by two minute postlabials.

Ear small, surrounded by eleven scales; one or two small lobules border anterior margin; the intercalated axillary scale rows short, the one between the seventh and eighth rows dropped in the midbody region so the count slightly anterior to the middle is 24 scale rows instead of 22 rows, which cover the latter half of the body; scales on the back not or scarcely larger than laterals or ventrals; 62 scales in a row from parietals to above anus; median row of scales under tail (which is missing save for a bit of the proximal portion) not or only moderately widened apparently; six preanal scales, the two median somewhat enlarged, the outermost smallest, the outer scales overlapping the inner; no differentiated lateral postanal scale (female); mental large, its labial border greater than that of rostral; a single undivided postmental; three pairs of chinshields, first forming a suture, the two succeeding separated; third pair followed by an elongate postgenial, bordered on its inner anterior edge by a scale broader than long; six lower labials. Limbs small, separated by 18 scales when adpressed on the sides of the body; the length of the hind limb contained four and one fourth times in body length; arm with a prominent thickened scale on the outer edge of wrist; three enlarged granules on the palm; lamellar formula of fingers: 4; 7; 9; 10; 6: 4; 8; 9; 10; 6. A greatly enlarged scute at base of heel, with two smaller inner scutes near the base of the first toe; lamellar formula for toes: 5; 8; 10; 12; 7: 5; 7; 10; 11; 7. No enlarged granules on sole; only a dorsal and a ventral series of scales on toes; the terminal scales not bound closely about the claws.

Color. Above dark ash-gray, the scales with darker centers which form six rather indistinct, darker, dotted rows on back; rostral and supranasals cream, with a dorsolateral light line originating on rostral, passing on outer edge of supraoculars, continuing back on third and fourth scale rows, and later, beginning at a point some distance behind shoulder, on fourth alone, growing dim posteriorly, where it occupies but one half of the fourth scale row; below this line a dark stripe begins on nasal, passes back above the ear, where it widens, then narrows to one whole and two half scale rows in width and passes to tail; below this the scales become gray, somewhat darker than on back, each scale with scattered darker areas not forming lines; upper labials and region in front and behind ear, cream; chin and throat cream; upper side of limbs dark; lower parts light, strongly differentiated; neck, below, cream, but scales

with darker areas; some scattered light flecks under base of tail; lateral light line absent on neck and side.

Measurements of the type of Eumeces dicei Ruthven and Gaige

	mm.		mm.
Snout to vent	47.0	Head length to posterior edge of interparietal	6.5
Snout to forearm	14.3	Axilla to groin	28.0
Snout to auricular opening	7.5	Foreleg	8.5
Snout to eye	3.1	Hind leg	10.5
Width anterior to ear	5.5	Adpressed limbs separated	12.0

Remarks. This species has been tentatively placed in the *Brevirostris* group and probably represents a very degenerate (specialized) member. It agrees in several characters with *E. brevirostris* and likewise shows many similarities to *egregius*, especially in the character of the temporals* and posterior labials.

In this species the limbs are proportionally smaller and more widely separated than in forms of *brevirostris* of equal size examined. *Egregius* has the ear opening farther removed from the seventh labial, with the scales anterior, overlapping and partially covering the ear opening; the median dorsal scales are wider. Before a more certain assignment of *dicei* can be made, larger series of specimens must be available to furnish data on variation. Nothing is now known of its habits.

Distribution and locality records. Only the type locality, Marmolejo, Tamaulipas, is known. Whether it occupies the coastal region or is a high mountain form is not known, since the type locality is intermediate between the two. (See Fig. 76 for distributional map.)

Eumeces ochoterenae Taylor

(Plate 43; Figs. 76, 82)

SYNONYMY

1933. *Eumeces ochoterenae* Taylor. Proc. Biol. Soc. Wash., XLVI, June 30, 1933, pp. 129-133 (Fig., lateral and ventral view of head, enlarged; type description; type locality Mazatlán [4 miles north of Chilpancingo] Guerrero, Mexico). (This name spelled *ochoteranae* is a typographical error.)

History. The series of specimens on which this species was founded was collected in the summer of 1932 by Hobart Smith and myself in the mountains in the neighborhood of Chilpancingo, Guerrero, Mex. A total of eleven specimens was obtained. It appears to be a high mountain form, and is probably restricted to elevations above five thousand feet.

* The description of the temporals in the type description differs from that given here, but it is due to different terminology (see diagram showing labeled scales of the genus [fig. 4] and discussion of temporals [page 71]).

The species was named for Dr. Isaac Ochoterena, director of the Instituto de Biologia, Chapultepec, D. F., Mexico, a noted Mexican histologist and botanist.

The type is in the Taylor-Smith collection. Paratype specimens have been presented to the Museum of Comparative Zoölogy, Harvard, the U. S. National Museum, and the Instituto de Biologia de México.

Diagnosis. A small, slender species, with limbs small, widely separated when adpressed; four supraoculars; interparietal not enclosed; two pairs of nuchals; seven upper labials; postmental single; no postnasal; primary temporal sometimes in contact with lower secondary temporal, separating seventh labial from the upper secondary temporal; scale bordering the inner side of the elongate postgenial wider than long; subcaudals widened; 22 (24) scale rows. Blackish or brownish, with a broad dorsolateral light stripe on the back, running to tail; a lateral line on labials to forearm; a black or black-brown lateral stripe; no trace of a median light line or forking lines on the head.

Description of the type. Rostral much wider than high, the portion visible from above less than half the area of the frontonasal; supranasals normal in size, forming a median suture, touching the anterior loreals; frontonasal six-sided, forming its longest sutures with the prefrontals, its shortest with the anterior loreal; prefrontals wider than long, forming a strong median suture and subequal sutures with the first supraocular, first superciliary and the two loreals; frontal longer than its distance from the tip of the snout, bordered by the three anterior supraoculars; first supraocular equally as large as fourth, second largest; frontoparietals small, square, forming a median suture; interparietal narrow, elongate, not enclosed behind by the parietals; latter diagonal, twice as long as their greatest width, narrowly separated posteriorly; two pairs of broad nuchals of about equal size.

Nasal small, the anterior part triangular, nearly as large as remainder of scale, including the nostril; no postnasal; anterior loreal nearly as long as high, distinctly higher than second loreal, which is about once and one half as long as high; seven-eight superciliaries; two presuboculars, the lower largest; three postsuboculars; seven upper labials, the first higher than the four succeeding scales; seventh labial somewhat larger than sixth, separated from the upper secondary temporal; the primary temporal small, quadrangular, touching lower secondary, which is fan-shaped; upper secondary

elongate, once and two thirds as long as its greatest width; tertiary temporal narrow and elongate, not entering the ear; seventh labial separated from the ear by two subequal pairs of postlabial scales; ear opening small, with one or two very black auricular lobules. Upper medial palpebral scales not separated from the superciliaries; lower eyelid with three enlarged opaque scales separated from the

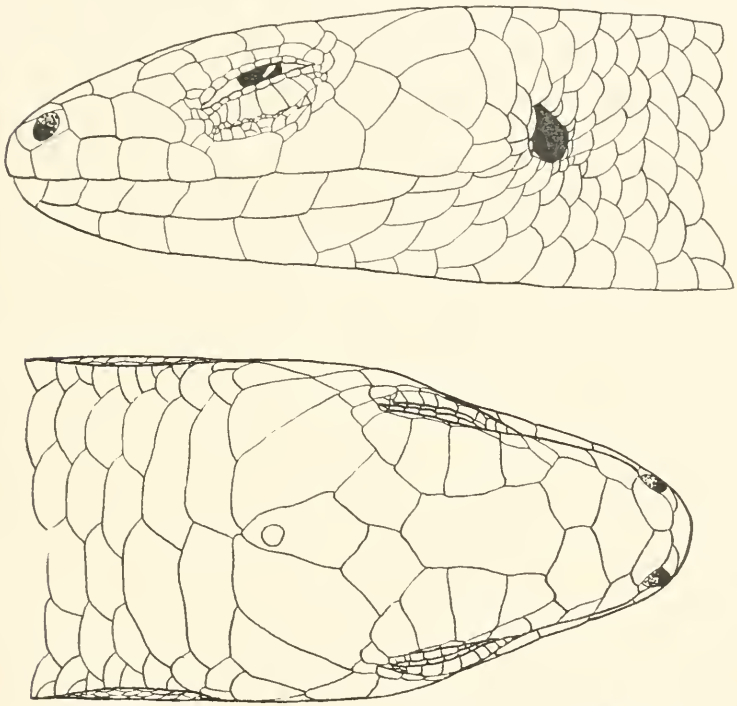

Fig. 82. *Eumeces ochoterenae* Taylor. E.H.T. and H.M.S. No. 1015, type. A, lateral view of head; B, dorsal view of head. Actual head length, 7.4 mm.; width, 6 mm.

subocular by two or three rows of small granular scales, six lower labials, last longest; mental moderate, having a labial border very slightly longer than the rostral; a single azygous postmental; three pairs of chinshields, the second pair largest; the third pair followed by an elongate postgenial bordered internally by a scale broader than long.

Body scales in 22 rows about the middle, the dorsal scales slightly larger than laterals or ventrals; scales on neck behind ear, 30 rows; narrow part of the neck, 23 rows; about base of tail, 15 rows; the subcaudal scales two and one half to three times as wide as long;

94 scales from anus to tip of tail; from occiput to above anus, 54; lateral scale rows generally parallel; marginal pits on scales numerous about insertion of arm and leg, but elsewhere dim or wanting; two enlarged preanals, with two smaller scales on each side, border the anus; the outer scales overlapping inner; lateral postanal scale slightly differentiated.

Palm with several enlarged tubercles, and with many smaller ones; the wrist tubercle prominent; lamellar formula for fingers: 4; 8; 10; 10; 6; the sole with one or two differentiated scales; the heel bordered by four flat scales or tubercles; lamellar formula for toes: 5; 8; 10; 12; 8; the terminal lamellae not tightly bound about base of claws.

Color. Above blackish to gray-brown, with irregular, minute, darker flecking; a broad, dorsolateral, light gray-white line origi-

Tables of measurements and scale counts of the type series

Number	Type 1015	1481	1483	1480	1012	1013	1482	1014	1484	1016	1017
Sex	♂	♂	♀	♂	♂	♂	♂	♂	yg.	yg.	yg.
Snout to vent	56	53	51.5	51.2	51	50.5	50	49.6	26	25.5	23
Tail	91	....	....	....	....	....	....	....	30	....	....
Snout to fore limb	17.2	16	16	16.5	16	15.7	16	16	10.2	8.9	9
Snout to ear	9	9.4	8.9	9	8.7	....	8.5	8.5	5.5	5.3	5.2
Axilla to groin	33	30.5	30	29	30	29	33	29	12	12.5	12.2
Width of head	6	7	7	7	7	7	6.7	6.3	....	....	....
Length of head	7.4	8	7.5	7.5	7.3	7.7	7.5	7.2	5	5	5.1
Width of body	8	8.7	8	9	8	7.8	7	8	4	4	3.8
Foreleg	8.9	10.2	9.8	10.7	9	9.2	9.2	9.2	5.2	4.4	4
Hind leg	14.1	14	13	14.3	13	13	13	13	8	7	5.8
Scale rows	22	23	22	24	22	22	23	23	22	23	22
Interparietal inclosed	no	no	no	no	no	no	no	no	no	no	no
Scales occiput to anus	55	54	54	55	56	53	55	54	54	57	55
Upper labials	7	7	7	7	7	7	7	7	7	7	7
Supraoculars	4	4	4	4	4	4	4	4	4	4	4
Nuchals, pairs	2	2	2	2	2	2	2	2	2	2	2
Postmentals	1	1	1	1	1	1	1	1	1	1	1
Postnasals	0	0	0	0	0	0	0	0	0	0	0
Largest labial	7	7	7	7	7	7	7	7	7	7	7
Frontonasal touches frontal	no	no	no	no	no	no	no	yes	no	no	no
Supraoculars touch frontal	3	3	3	3	3	3	3	3	3	3	3
Seventh labial touches upper sec. temporal	no	no	no	yes	no	no	no	yes	yes	yes	yes

nating on the rostral, passes back over head and along sides and onto the proximal third of the tail; this line occupies the outer two thirds of the second scale row, and the inner half of the third (the color is not clear, but is dirty-looking due to flecking with darker color); a lateral line begins on the rostral and passes back to near insertion of foreleg; only the lower edge of the auricular opening is involved; the color becomes much intensified below the eye and from there on back is a silvery white; lower labials, chin, and throat light; abdomen, sides and under limbs, grayish or bluish-gray, flecked with minute darker areas; tail brownish at base, but distal two thirds of a very deep purplish-blue color, less pronounced below. Ear lobules black.

Variation. The chief variations are listed in the table. The scales preceding the ear, between ear and seventh labial are usually as described, but may be replaced by two elongate ones, or three, with the upper two uniting. The character of the temporals (the relation of the seventh labial to the upper secondary temporal) is variable; they are separated in about half of the specimens and form a common suture in the other half. The number of subcaudal scales varies from 84 to 90.

Remarks. This form is apparently related to *Eumeces brevirostris*, but differs in having a lower average count of scale rows; smaller and shorter limbs; the much broader dorsolateral lines (separated by two whole and two half dark-colored scales); in the absence of a lateral light line along the sides of the abdomen; in the retention of blue color in the tails of adults; and a smaller average number of scales from parietals to above anus (usually 6 to 8 less).

This form was first encountered at Mazatlán, near Chilpancingo, Guerrero, Mexico, June 26, 1932. The specimens were routed from under stones and leaves and the rotting masses of agave plants. A few days later, July 1, 1932, several specimens were taken high in the mountains in pine forest between the villages of Rincón and Cajones, south of Chilpancingo. These specimens were found usually in rock ledges and under leaves at the base of large boulders.

A total of eleven specimens was taken. No other species of the genus was found in our collecting in the state of Guerrero.

Distribution. The species is presumably confined to the Sierra Madre del Sur, Mexico.

Locality records:

Guerrero: Mazatlán, 4 miles north of Chilpancingo (Taylor-Smith 6); between Rincón and Cajones, near Chilpancingo (Taylor-Smith 5).

EGREGIUS GROUP

This group, comprising the two subspecies of *Eumeces egregius*, is characterized as follows: Very small species, oviparous, lacking all trace of a median line or bifurcating lines on the head; dorsolateral and lateral light lines present, either short or extending to tail. Two pairs of chinshields; three supraoculars; no primary temporal; superciliary series broken by small postocular; ear opening partly covered by scales; 18-22 scale rows; limbs widely separated. Tail pink or orange in young and adult. The species, with its two subspecies, occupies the extreme southeastern part of the United States in Florida, including the outlying islands, and contiguous part of Georgia.

The specialization of this group is such that I can find no well-defined point of contact with the remaining species of the genus. It is significant, however, that certain degenerate (specialized) members of the *Brevirostris* group approach the *Egregius* group in certain characters.

Eumeces egregius (Baird)

I have found it necessary to recognize two subspecies of this species, which may be characterized as follows:

A. Four well-defined narrow light lines extending onto tail, the dorsolateral lines occupying the medial part of the second scale row, separated by two whole and two half scale rows, from its fellow; the lateral line separated from the dorsolateral by two whole rows and two half rows of scales; the median scale rows much larger than adjoining rows.....*Eumeces egregius egregius* (Baird), page 490

AA. Four light lines evident anteriorly, usually widened, the dorsolateral occupying part of two scale rows, and if continued following the middle of the third row, separated from its fellow by four whole and two half rows of scales; lateral line usually short, but if present separated from the dorsolateral line by one whole and two half rows of scales; the median dorsal scales only slightly larger than adjacent rows.
Eumeces egregius onocrepis (Cope), page 497

Eumeces egregius egregius (Baird)

(Plate 31, Fig. 2; Figs. 83, 84)

SYNONYMY

1858. *Plestiodon egregius* Baird. Proc. Acad. Nat. Sci. Phila., 1858, p. 256 (type description; type locality, Indian Key, Fla.; collector, G. Wurdemann; type No. 3128 U.S.N.M.); Stejneger and Barbour, Check List N. Amer. Amph. Rept., 1917, p. 69 (part.) (western Florida and the Florida Keys).

1875. *Eumeces egregius* Cope. Bull. U. S. Nat. Mus., No. I. 1875, p. 45; Davis and Rice, Ill. State Lab. Nat. Hist., Bull. 5, 1883, p. 46; Garman, Bull. Essex Inst., XVI, Jan. 9, 1884, p. 15; Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 381; Cope, Ann. Rept. U. S. Nat. Mus., 1898 (1900), p. 655, fig. 132 (part.) (complete description; places *E. onocrepis* in synonymy); Ditmars, The Reptile Book, 1915, p. 199; Pratt, Vert. Anim. U. S., 1923, p. 207; Stejneger and Barbour, Check List N. Amer. Amph. Rept., 2d Ed., 1923, p. 75 (part.) (western Florida and the Florida Keys); Loveridge, Copeia, No. 173, Jan. 16, 1930, p. 112 (part.) (variation, Royal Palm Beach); Van Hyning, Copeia, No. 1, Apr. 3, 1933, p. 5 (part.) (Florida).

History. The types of this subspecies were collected on Indian Key by Mr. G. Wurdemann and were sent to the United States National Museum where they were described by Spencer F. Baird under the name of *Plestiodon egregius*. The description is very brief, and certain of the statements are erroneous (at least in view of a more modern nomenclature). The type description states: "One post-nasal plate; post-frontal and inter-nasals separated by a post-nasal. Four upper labials. Ears very small. Two central dorsal rows largest. Body cylindrical. Color reddish ash, with two or three white lines on each side, margined with dusky, sometimes a third; all these along the centers of single rows of scales. Upper lateral lines separated by two plain rows. Body encircled by about 22 rows of scales."

The statement, "one post-nasal" refers no doubt to the anterior loreal, since a postnasal is absent; likewise the statement "four upper labials" is incorrect, as seven upper labials are present in both cotypes normally.

Diagnosis. One of the smallest species of the genus, characterized by a pair of narrow dorsolateral lines and a pair of lateral lines complete to tail; tail rose or orange-colored. Three supraoculars; parietals usually not enclosing interparietal; superciliary series interrupted posteriorly by an enlarged postocular; no postnasal; two postmentals; two pairs of chinshields; scale bordering enlarged postgenial wider than long; last labial broadly in contact with the upper secondary temporal; anterior temporal wanting; a small postlabial; tertiary temporal separated from ear by two large scales, the last of the series overlapping auricular opening; median scale rows wider than adjoining rows.

Description of subspecies (from U.S.N.M. No. 61692. Big Pine Key, Monroe Co., Florida). Portion of rostral visible above, triangular, more than half as large as the frontonasal; supranasals larger than nasals, forming a strong median suture; frontonasal moderate, broadly in contact with the anterior loreal, forming a suture with the frontal; prefrontals separated, forming equal sutures with the frontal, first superciliary, posterior loreal, and frontonasal, not in contact with the first supraocular; frontal narrow, elongate, its length much greater than its distance from the end of the snout, in contact laterally with two supraoculars and the first superciliary; frontoparietals larger than the prefrontals, forming a broad median suture; interparietal large, larger than a frontoparietal, not enclosed by the parietals; latter large, typical; two pairs of nuchals, of equal size.

Nasal small, divided by a suture; the nostril pierced somewhat back of the rostrolabial suture; anterior loreal much higher than wide, higher than posterior loreal; latter subrectangular, once and two thirds as long as high; two presuboculars; a small preocular, followed by one large and one or two small granular scales; six superciliaries, the enlarged postocular entering the series and separating the last superciliary from the series; the anterior superciliary very large, touching the frontal; three supraoculars, the anterior very large, triangular; three postsuboculars, the upper much the largest; anterior temporal missing; upper secondary very large, broadly in contact with sixth and seventh labials; lower secondary temporal wanting (or occupying place of the tertiary temporal); the

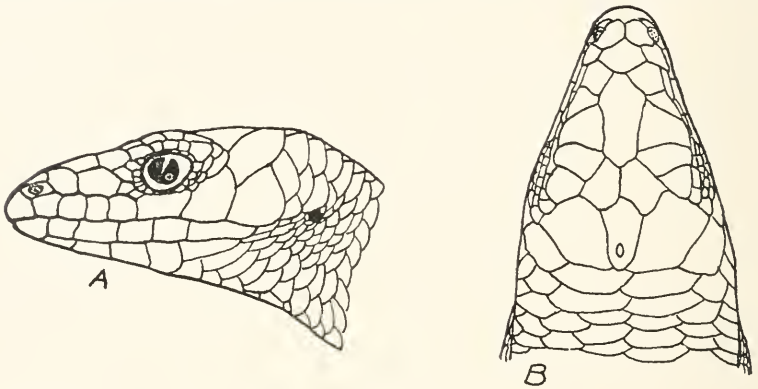

FIG. 83. *Eumeces egregius egregius* (Baird). U.S.N.M. No. 61692; Big Pine Key, Florida. A, lateral view of head; B, dorsal view of head. Actual head length, 7.2 mm.; width, 6 mm.

tertiary temporal not strongly differentiated and not in contact with the upper secondary; a small postlabial separated from ear by the lower end of an elongated scale which overhangs the ear and partly conceals the opening. Four equal-sized anterior labials precede the subocular, which is large, and much elongated; sixth and seventh labials large, of nearly equal size, or the seventh largest. The eye small, its length two and one third times its distance from tip of snout; upper palpebral series of scales forming sutures with the superciliaries the greater part of its length. Enlarged scales on lower eyelid separated from the subocular by about two rows of granules. (Lower eyelid not shown in fig. 83.)

Five lower labials; mental large, with a labial border much greater than that of rostral; two postmentals, the second very large proportionally; only two pairs of chinshields, the first pair in contact,

the second pair separated by three scales; postgenials large, bordered on medial side by a scale wider than long.

Ear opening small, surrounded by 10-12 scales. Scale rows on the sides parallel, the two median dorsal rows distinctly widened; scales around neck behind ear, 26; about narrow part of neck, 27; about axillary region, 28; about middle of body, 22; the intercalated rows in axilla drop out before a distance equal to the length of the arm is reached; lateral and ventral scales about equal in size, both smaller than median dorsals; subcaudals widened; vent bordered anteriorly by six scales, the median scales enlarged, the outer ones small, overlapping the inner scales; about 13 scales around insertion of forelimb; outer wrist scale well developed; palm with three enlarged granules; lamellar formula for fingers: 5; 8; 11; 11; 7. An area of small granular scales in the axilla extending somewhat above insertion of arm. About 14 scales around insertion of leg; heel bordered by four larger padlike scales, the posterior not in contact medially; one or two larger tubercular scales on sole; outer half of foot with imbricating scales; inner scales tubercular. Lamellar formula for toes: 5; 8; 10; 14; 8; terminal lamellae not tightly bound about claws; no intercalated scales between dorsal and ventral lamellae.

Color. Above, medially, brownish-gray, the scales flecked with darker color, this occupying two thirds of the median scale rows; dorsolateral white line beginning on the snout, widening on the prefrontals, then continuing back on the sides of head and body, following the middle of the second scale row, the inner border of which is brown, leaving the dorsolateral white stripe bordered by a brown stripe above; a lateral dark stripe along the sides occupying outer part of second scale row, the third, fourth and part of fifth, the color not uniform, the scales with grayish white dots forming two very indistinct lighter lines; lateral light line begins on rostral, passes along lower edge of first four labials (the upper edges of which are dark), then widens somewhat, passing back to upper part of ear, leaving a dark line on lower part of the posterior labials; the line then continues directly behind ear and along the sides onto the tail, following the middle of the fifth scale row; below the lateral line there is a narrow dark line which merges into the gray color of lower lateral region; chin, throat and abdomen dirty white; tail somewhat yellowish-brown, probably orange in life. The white lines continue on the tail to a point where regeneration has replaced original tail (probably continuing half length of tail normally). A

Measurements of *Eumeces egregius egregius* (Baird)

Museum Number†	U.S.N.M. 3127	U.S.N.M. 3127	M.C.Z. 978	U.S.N.M. 61692	M.C.Z. 6152	A.M.N.H. 22423	Mich. 57725	Roch. ?	M.C.Z. 6152
Snout to vent	52	50	49	46	44	44	43	42	30
Tail	39*	51*	52*	.....	34*	60*	58*	75	.....
Snout to foreleg	16	15	15	13.5	12	13	13	13	10
Axilla to groin	.....	.....	.....	27	.....	.....	23	25	.....
Width of head	5	5	5	6	6	4	5	5	4.5
Length of head	.....	.....	7.5	7.2	7	.....	6.9	7	5
Foreleg	8	7	8	8	6	8	8	9	5
Hind leg	13	13	12	11	11	11	12	12	8
Longest toe	5	5	5	5	5	5.5	4	5	4

* Regenerated.

† No. 3127 (2 spec.), Indian Key, Florida; 978, Tortugas, Florida; 61692, Big Pine Key, Florida; 22423, Dinsmore, Duval Co., Florida; 57725, Alachua Co., Florida; Rochester specimen, Bardis Church, Charlton Co., Georgia; 6152 (2 spec.), Key West, Florida.

dim sublateral line is evident on tail. A second regenerated portion of tail is forked.

Variations. The color characters of the specimens of this subspecies examined vary somewhat in shade and somewhat in the amount of darker pigment, but agree in the essential markings. The narrow dorsolateral light lines are of uniform width, separated by two whole scale rows, and two half scale rows, the lines extending onto the tail a greater or lesser distance; the lateral light line is separated from the dorsolateral by two whole scale rows, and two half rows on the sides of the body.

The scales vary somewhat but the two median rows are very distinctly larger than adjoining rows and the scales under the tail appear to have a smaller transverse length and greater longitudinal width than the related form, *onocrepis*.

The scales from parietals to above vent vary between 64 and 69, the average being 65.5. The number of scales about the body is 20 or 22, the former number occurring four times, the latter five times, the variation not bearing any definite relation to geographical distribution.

The number of labials is likewise variable, either six or seven being present; the former number is present in five specimens, the latter in four, the variation apparently having no relation to distribution. The lower labials are usually five, although there are six present in two specimens; the nuchals are two-two in all save the specimen from southern Georgia, where only one pair is present. The scales following, however, are enlarged; three supraoculars are invariably present; the frontonasal and frontal are in contact in seven specimens (separate in the types). The postmentals are invariably two; only two pairs of chinshields. The last upper labial is usually largest, but in certain specimens the last two are of nearly equal size. The number of lamellae under the fourth toe varies from 10-14.

The markings on the back are often bronzy, with darker and lighter flecks, sometimes showing strong metallic reflections. The part bordering the dorsal light lines is darker than elsewhere. The lateral dark stripe is likewise mixed with bronze and black flecks very similar to the dorsal coloration, save that the darker and lighter parts are often more pronounced. The lateral line is much wider on the labials, and frequently passes to the upper part of ear, then begins on the lower part of ear behind, leaving a break in the continuity of the line. If the abdomen is light, the lateral line may

merge somewhat in the lateral abdominal color. On the island forms, however, it is usually quite distinct.

Remarks. The reëstablishment of the two forms of *Eumeces egregius* has been difficult because of inadequate material. When Cope described *onocrepis* he probably had not examined the types of *egregius*. Compared with the type description they seemed wholly unlike. In his work on the species in the Crocodilians, Lizards, etc. (1900), he probably examined the types, which, if they were as they are today, might resemble *onocrepis* in many scale characters, the color and markings now being wholly obliterated.

I am convinced that originally two entirely distinct species were in existence, one probably developed by isolation on an island or islands but which now, due to the union of this land with the continent, has tended to spread over the territory occupied by the other form. The southern form is the typical *egregius;* the typical *onocrepis*, that of the western part of the peninsula. It is obvious that the two forms at present overlap in their distribution in the central and eastern parts. I am not wholly certain from my examination of the material available that there is actual intergradation. Unfortunately I have had no large series from a single locality; and it is possible that the variations in a single locality may be greater than I now believe possible. At best an examination of a few specimens at a time, and these from various collections, mitigate against the construction of an accurate picture of the material. I am certain that the wisest course is to separate the two forms as subspecies and leave the final disposition to some worker who can segregate much new, well-preserved material from all parts of the two ranges. Then and only then can the true status of the two forms be determined. Certainly nothing can be gained by leaving them in their present status, when they may be worthy of specific rank, as is suggested by the fact that certain *egregius egregius* appear to be present in the northeastern part of the range of *egregius onocrepis*.

Distribution and locality records. (See Fig. 84 for distributional map.)

FLORIDA:

Monroe Co.: Indian key (U.S.N.M. 2, types, No. 3127, collected by G. Wurdemann); Tortugas (M.C.Z. 1); Key West (M.C.Z. 2); Big Pine Key (U.S.N.M. 1).

Alachua Co.: (Mich. 1).

Duval Co.: Dinsmore (A.M.N.H. 1).

GEORGIA: *Charlton Co.:* Sardis Church (Univ. Rochester, N. Y. 1).

Eumeces egregius onocrepis (Cope)

(Plate 31, Fig. 1; Fig. 84)

SYNONYMY

1871. *Plistodon onocrepis* Cope. Second and Third Rept. Peabody Acad. Sci., 1871, pp. 82, 83 (type description; type locality, Dummet's Plantation, Florida; Mr. Maynard collector; type originally in the museum of the Peabody Academy of Sciences. Present location unknown).

1875. *Eumeces onocrepis* Cope. Bull. U. S. Nat. Mus., No. 1, 1875, p. 45; Davis and Rice, Ill. State Lab. Nat. Hist., Bull., No. 5, 1883, p. 46; Garman, Bull. Essex Inst., XVI, 1884, p. 15; Boulenger, Cat. Liz. Brit. Mus., III, 1887, p. 380; Cope, Ann. Rept. U. S. Nat. Mus., 1898 (1900), p. 655, fig. 132 (part.) (description; places *E. onocrepis* in synonymy of *egregius*); Stejneger and Barbour, Check List N. Amer. Amph. Rept., 2d Ed., 1923, p. 75 (part.); Loveridge, Copeia, No. 173, Jan. 16, 1930, p. 112 (part.; variation); Van Hyning, Copeia, No. 1, Apr. 3, 1933, p. 5 (part.) (Fla.); Stejneger and Barbour, Check List N. Amer. Amph. Rept., 3d Ed., 1933, pp. 80, 81 (part.).

History. In 1871 Cope described *Plistodon onocrepis,* the description based on a specimen collected by Mr. Maynard, for the Peabody Academy of Science, at Dummet's Plantation, Florida. I have been unable to discover in what part of Florida this locality occurs.

The description is rather brief and seems to be in error in two points. The statement: "superciliaries only three" should probably read "supraoculars only three." The statement: "eight superior labials" should probably be "seven superior labials," since it is probable that he counted the rather large postlabial as the eighth.

Later, Cope (1900) placed *onocrepis* in the synonymy of *egregius.* Just why he did this is not wholly clear, since no comment is offered. I doubt that Cope ever compared the two forms directly. I regard it likely that when Cope was writing the account of *egregius* (1900) the original type of *onocrepis* had been lost; and the types of *egregius* (if they were as I find them at the present time) were in such a state as to hide all characters of coloration.

The material available for the study of this form has not been sufficient to obtain a clear picture of the range of the form, or to understand clearly the meaning of the variations that obtain.

From the specimens available it seems certain that *onocrepis* is confined to the mainland of Florida.

Diagnosis. Similar to *egregius egregius,* but with the dorsolateral lines usually short, somewhat widened; if continuous, separated on back by four whole rows and two half rows of scales, the median scale rows not strongly enlarged. Labials six or seven; two postmentals; no postnasal; two pairs of chinshields; three supraoculars; tail pink or orange in life.

Description of subspecies (from California Academy of Science,

No. 17992, Fruitland Park, Fla.; C. Brimley, collector). Portion of rostral visible above less than half the size of the frontonasal; supranasals rather small, forming a median suture; frontoparietal much larger than a prefrontal, in contact with the anterior loreal and narrowly with the frontal; prefrontals smaller than the frontoparietals, the sutures with the frontonasal and frontal largest, those with first superciliaries and loreals subequal; frontal longer than its distance from the end of the snout, touching two supraoculars (apparently a little shorter and wider than in *egregius*); frontoparietals longer than wide, in contact medially; interparietal larger than frontoparietals, not enclosed by the parietals; latter about twice as long as wide; two pairs of nuchals; nasal small, divided; anterior loreal much higher than posterior loreal; latter nearly rectangular; two presuboculars; three supraoculars; seven superciliaries, the anterior relatively very large, the series broken by the upper, enlarged postocular which separates the sixth from seventh superciliary; a small preocular, followed by a few granules; three postsuboculars; primary temporal wanting. Upper secondary temporal large, subrectangular, broadly in contact with the sixth and seventh labials; the lower secondary absent; tertiary temporal small, separated from ear by two scales; seven upper labials, four preceding the subocular, of which the first of the series is largest; subocular low, elongated, twice as long as high; the sixth and seventh upper labials of about equal size; one postlabial, separated from the minute ear by a large scale that partially overlies the auricular opening.

Mental large, followed by two postmentals; two pairs of chinshields, the anterior pair in contact; second pair followed by an enlarged postgenial, bordered internally by a scale longer than wide (on one side this scale is fused to the postgenial and the adjoining scale is wider than long); lower labials, five-six.

Eye small; the upper median palpebrals in contact with the superciliaries; lower lid with four enlarged plates, separated from the subocular by two or three rows of granules; ear minute, surrounded by eight or nine scales; scales on body in parallel series; the dorsals not strongly enlarged, the median dorsal rows only a little larger than those on sides; 24 scales about neck behind ear; 22 on narrower part of neck; 24 in axillary region; 20 about the middle of body. Subcaudal scales much widened, short (longitudinally). Six preanals, the median pair much enlarged, the outer scales small, overlapping the inner scales; no differentiated lateral postanal scale.

Area of small scales in axilla much less than in described specimen of *egregius;* none behind insertion of hind leg; outer wrist tubercle not strongly defined; a few enlarged scales on palm behind origin of fingers. Lamellar formula for fingers: 4; 8; 11; 10; 7. Heel bordered by four or five large scales; outer half of foot covered with large imbricate scales; inner half granular. Lamellar formula for toes: 5; 7; 11; 14; 8.

Pits on the scales dim (or wanting). In *egregius* these are usually well defined in region on side of neck, behind axilla, and in the post-humeral and postfemoral regions.

Adpressed limbs widely separated even in youngest specimens; a separation of 18 mm. in largest specimens, to 4 mm. in smallest examined, when limbs are adpressed.

Color in alcohol. Above, brown, with the color growing lighter posteriorly, becoming yellowish-orange on the base of the tail (greater part of tail missing); dorsolateral line beginning on rostral (which is practically all whitish) continues back, as a somewhat discontinuous, much widened line to the back of the prefrontal. Here it narrows and continues back on side of head and shoulder where it moves from the second to the third row of scales. It can be traced some distance on the back; it is separated from its fellow by four whole rows and two part rows of scales. The lateral line begins on rostral, continues nearly straight back to ear, the edges irregular; behind ear it can be traced to above axilla where it becomes lost; below brownish-yellow or yellow-flesh; the lower part of tail orange.

Variation. The color varies considerably. The dorsal ground color is usually brown, but may be light grayish with dark flecks. The dorsolateral line in typical western and central Florida specimens is widened on the shoulders, occupying parts of two scale rows on the region above arm, and then tending to disappear farther back, even in younger specimens; if it does not disappear it follows as an indistinct narrow line along the middle of the third scale row. Occasional specimens show the line somewhat narrow on the anterior part. In most of the specimens there is no discernible darker line following the dorsolateral or at most extending only a short distance on neck. The tails of all specimens show evidence of having been pink or orange in life. Sometimes the dorsal pigment forms more or less distinct dotted lines which may continue on the tail.

Variation in scalation is no greater than is usual in the genus. The scales from parietal to above vent vary from 60 to 67, the

Measurements of *Eumeces egregius onocrepis* (Cope)

Museum Number**	U.S.N.M. 75294	U.S.N.M. 60516	U.S.N.M. 60515	U.S.N.M. 49738	U.S.N.M. 75296	U.S.N.M. 26309	C.A.S. 17992	U.S.N.M. 56982	U.S.N.M. 69657	U.S.N.M. 12002
Snout to vent	58	57	54	53	50	45	40	40	38	31
Tail	62*	.....	44*	.....	.....	85.5	.....	71	53.5	32*
Snout to foreleg	16	17.2	16	16	14	14	13.2	12.2	11.5	10
Axilla to groin	36	37	35	35	34	27	22	22	21	17
Width of head	6.1	6.8	6	7	6	5.1	4.4	5.1	4.5	4
Length of head	8	8.2	8	7.5	7.2	7	6.2	6.4	6.4	5.1
Foreleg	10	8.2	9	7.1	8	8	7	8	7	5.6
Hind leg	14	15	14.8	14	13	12	13	11.6	11	9
Longest toe	5.2	6	5.2	5.4	5	4.2	4.4	4.8	4.5	4

* Partially regenerated.
** Numbers 56982, 69657, 75294, 75296, Lake Co., Fla.; Nos. 49738, 60515, 60516, Auburndale, Fla.; 26309, Lemon City, Fla.; 12002, Georgiana, Fla.; 17992, Fruitland Park, Fla.

higher numbers being present in the females, the average for all being 62.6. The number of scale rows about body is 18-22; the number 18 occurring once (Royal Palm Beach), 22 occurring once (Lake Co., Fla.) (*fide* Charles Burt) and 20 in all other counts (26). The upper labials are six or seven; the arrangement 6-6 occurs seven times; 7-7, eight times; and 6-7, four times, in nineteen specimens counted; the lower labials are 5, four occurring once. The scales around ear vary from eight to eleven, 8 occurring eight times; 9, thirteen times; 10, ten times, and 11, twice. The nuchals show two exceptions to the normal two pairs; in one the formula is 2-3; in one 2-1. The postmentals and chinshields appear to be invariable and the postnasal is always absent. Frequently the last two labials are subequal. The superciliaries are either seven or eight, the latter number being most frequent; two specimens have nine. The frontal is in contact with the frontonasal in all but a single specimen.

Lamellae under the fourth toe vary from 13 to 17, the lower numbers being of most frequent occurrence. The supraoculars are three save in one specimen from Petersburg, Fla., which has four. The anterior superciliary rarely touches frontal.

Distribution. This form seems to be widely distributed in peninsular Florida. It occurs from coast to coast, east to west. It ap-

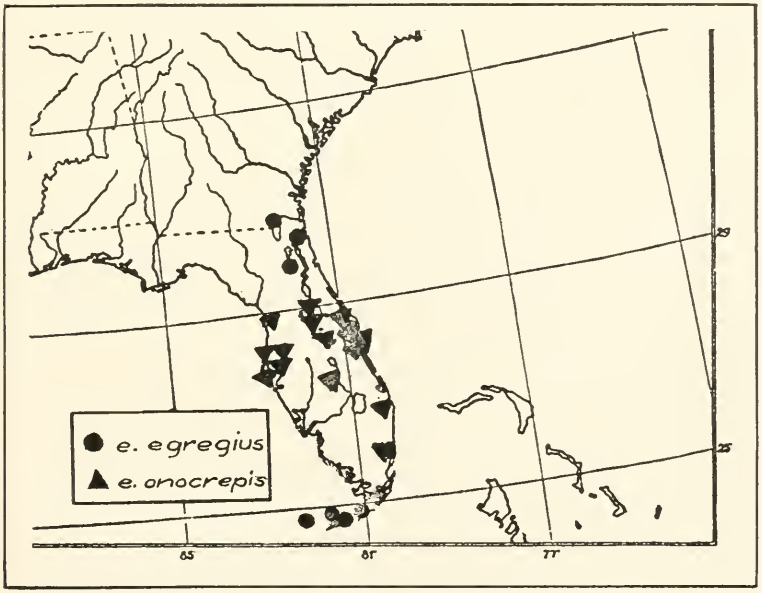

FIG. 84. Distribution of *Eumeces egregius egregius* (Baird), and *E. e. onocrepis* (Cope), in Florida.

pears to overlap the territory occupied by *egregius* in the east. However, no typical *egregius* have been taken in the western part of Florida and no typical *onocrepis* have been taken in the keys. Whether the forms intergrade can only be positively determined by much larger series of specimens than are at present available; the probabilities are that they do, but my observations seem to show that the possibility of intergradation is not beyond doubt. Future study may warrant specific recognition.

Locality records:

FLORIDA (A.M.N.H. 1):

Lake Co.: (U.S.N.M. 3) (A.M.N.H. 1) (M.C.Z. 3); Tavares (U.S.N.M. 2); Fruitland Park (C.A.S. 1) (Cornell 1).

Polk Co.: Auburndale (U.S.N.M. 4).

Dade Co.: Lemon City (U.S.N.M. 3).

Brevard Co.: Georgiana (U.S.N. M. 4) (M.C.Z. 1).

Pinelas Co.: St. Petersburg (M.C.Z. 3) (Cornell 4).

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CALABRESI, ENRICA. 1923. Mission Zoologica del Dr. E. Festa in Cirenaica. Boll. dei Mus. Zool. Anat. Comp. Univ. Torino, XXXVII (n.s.), N. 7, pp. 1-28.
Reports collections of *Eumeces schneiderii* (Daudin) at Bengasi and Tobvuk.

CAMP, CHARLES LEWIS. 1916. The subspecies of *Sceloporus occidentalis*, with description of a new form from the Sierra Nevada, and systematic notes on other California lizards. Univ. Calif. Zoöl., XVII, 1916, pp. 63-74.
The author erroneously refers *Eumeces gilberti* Van Denburgh to the synonymy of *E. skiltonianus*.

——— 1923. Classification of the lizards. Bull. Amer. Mus. Nat. Hist., XLVIII, Art. XI, 1923, pp. 289-435, figs. 1-112.
Notes on skull bones.

CANTOR, THEODORE. 1842. General features of Chusan, with remarks on the fauna and flora of that island. Ann. Mag. Nat. Hist., (1), IX.
Type description given of *Tiliqua rufo-guttata*.

CATESBY, MARC. 1751-1754. The natural history of Carolina, Florida, and the Bahama Islands. London, 1751 and 1754, 2 vols., folio, col. pls. 1-120.
Lacerta cauda caerulea, which is figured in Vol. II, pl. 67, is the basis of Linnaeus' *Lacerta fasciata*.
A Latin and German edition published in Nuremburg bears the title "Piscium et Serpentium imagines quas Marcus Catesby tradidit 1750-1777." in 2 vols., folio, pls. 1-109.

CHANG, MANGVEN L. Y. 1932. Notes on a collection of reptiles from Szechuan. Cont. Biol. Lab. Sci. Soc. China, VIII, Zoöl. Ser., No. 2, pp. 9-95, fig. 4.
Gives a complete description of *Eumeces elegans*, and lists the form from Chung kiang, and Kiating in Szechwan.

COCKERELL, T. D. A. 1896. Reptiles and batrachians of Mesilla Valley, New Mexico. Amer. Nat., Apr. 1896, pp. 325-327.
Eumeces obsoletus mentioned on p. 326, with no more data than that they were not rare near the college near Las Cruces.

——— 1927. The zoölogy of Colorado. Univ. Colo. Semicent. Series (Denver, Colo.), Vol. III, 1927, pp. 1-262.
Mentions *Eumeces multivirgatus* and *obsoletus*.

COCTEAU. 1837. Tabl. Synopt. Scinc.
Euprepis de Catesby mentioned.

CONANT, ROGER. 1930. Field notes of a collecting trip. Bull. Antivenin Inst. of Amer., IV, No. 3, 1930, pp. 60-64.
Lists locality records for *Eumeces fasciatus*. Certain of these refer to other species.

COOK, LORENZO. 1930. Notes on an Arizona elegans occidentalis. Copeia, Dec. 1930, No. 4, p. 158.
E. skiltonianus mentioned from near the International Boundary Monument No. 258.

COPE, EDWARD D. 1861. On the Reptilia of Sombrero and Bermuda. Proc. Phila. Acad. Nat. Sci., Oct., 1861, pp. 312-314.
On page 320 is given the type description of *Plestiodon longirostris* (U.S.N.M. 4737) from Bermuda.

——— 1865. Third contribution to the herpetology of tropical America. Proc. Acad. Nat. Sci. Phila., 1865, pp. 185-198.
Plistodon lynxe is reported from "Tableland and Southern Mountains [of Mexico]."

——— 1866. On the Reptilia and Batrachia of the Sonoran province of the Nearctic region. Proc. Acad. Nat. Sci. Phila., 1866, pp. 300-314.
Lists *Plistodon obsoletus* and *guttulatus*.

——— 1866*a*. Fifth contribution to the herpetology of tropical America. Proc. Acad. Nat. Sci. Phila., 1866, pp. 317-323.
Contains the type description of *Eumeces sumichrasti*. The type was collected by Sumichrast, at "Orizava," Mexico.

——— 1871. Catalogue of reptilia and batrachia obtained by C. J. Maynard in Florida. 2d and 3d Rept. Peabody Acad. Sci., 1871, pp. 82-85.
Type description of *Plistodon onocrepis* from Dummets plantation, Florida, is included. The *Plistodon lineatus* listed is probably a lapsus for *quinquelineatus*.

——— 1875. Checklist of North American batrachians and reptiles. Bull. U. S. Nat. Mus., No. 1, 1875, pp. 1-104.
The North American species listed are as follows (pp. 44-45); *Eumeces septentrionalis, egregius, tetragrammus, anthracinus, onocrepis, inornatus, multivirgatus, leptogrammus, obsoletus, guttulatus, skiltonianus, fasciatus* and *longirostris*.

——— 1877. On some new and little known reptiles and fishes from the Austroriparian Region. Proc. Amer. Philos. Soc., XVII, June 1877-June 1878, pp. 63-68.
Eumeces anthracinus variety (=*E. pluvialis* Cope) is reported, and *Eumeces striatus* (probably a lapsus for *fasciatus*) is listed from Volusia, Florida.

——— 1880. On the zoölogical position of Texas. Bull. U. S. Nat. Mus., No. 17, 1880, pp. 1-52.
Type descriptions are given of *Eumeces epipleurotis* from the northern boundary of Texas and from Nebraska, pp. 40-41; *Eumeces pachyurus* from near Dallas, Tex.; and *Eumeces pluvialis* (footnote to p. 19) from near Mobile, Ala. *E. obsoletus* is reported from Helotes, Tex. Specimens from Douglas county, Kansas, are described and variation noted. *Eumeces brevilineatus* is noted from Helotes creek, 20 miles northwest of San Antonio, Tex., and *Eumeces fasciatus* is listed with a statement that *Eumeces erythrocephalus, quinquelineatus* and *fasciatus* are forms of the same species, according to Professor Baird.

——— 1883. Notes on the geographical distribution of Batrachia and Reptilia in western North America. Proc. Acad. Nat. Sci. Phila., 1883, pp. 10-35.
Gives locality records for *Eumeces skiltonianus*.

——— 1885. Twelfth contribution to the herpetology of tropical America. Proc. Amer. Philos. Soc., XXII, pp. 167-194.
Lists *Eumeces brevirostris, E. dugesi, E. schwarzei* (sic), *E. lynxe, E. sumichrasti* and *E. callicephalus*, giving key characters. Describes as new *Eumeces furcirostris* (from Jalapa).

——— 1885*a*. A contribution to the herpetology of Mexico. Proc. Amer. Philos. Soc., XXII, pp. 379-404.
Describes *Eumeces brevirostris* var. from either the Valley of Mexico or the adjacent one of Toluca. This is *Eumeces copei* Taylor. Mentions also *E. furcirostris* from Jalapa (p. 380), which is the type locality.

——— 1887. Catalogue of the reptiles and batrachians of Central America and Mexico. Bull. U. S. Nat. Mus., 32, 1887, pp. 1-96.
Lists *Eumeces brevirostris*, giving the published locality records. The locality "Valleys of Mexico or Toluca" is in reference to specimens of *Eumeces copei* Taylor. *E. bocourti*, *E. dugesi*, *E. schwartzei*, *E. lynxe*, *E. sumichrasti*, *E. callicephalus* and *E. furcirostris* are listed. *E. obsoletus* is reported from the city of Chihuahua.

——— 1892. The osteology of the Lacertilia. Proc. Amer. Philos. Soc., XXX, Apr. 1892, No. 138, pp. 185-220, pls. 2-6.
The osteology of *Eumeces obsoletus* and *fasciatus* is discussed, pp. 213-215.

——— 1892*a*. The Batrachia and Reptilia of northwestern Texas. Proc. Acad. Nat. Sci. Phila., 1892, pp. 331-336.
Reports *Eumeces obsoletus* from Big Spring, Texas.

——— 1896. The geographic distribution of Batrachia and Reptilia in North America. Amer. Nat., 1896, pp. 886-902; Dec., 1896, pp. 1003-1026.
Discusses the distribution of the several known species of *Eumeces* in America.

——— 1900. Crocodilians, lizards and snakes of North America. Rept. U. S. Nat. Mus., 1898, pp. xi-xviii, 155-1270, pls. 1-36, text figs. 1-347.
Pages 624-665 deal with the genus *Eumeces* of the United States, with keys including the Mexican species. Fourteen American species are described, with three new varieties: *Eumeces quinquelineatus polygrammus*, from Colonel's Island, Ga.; *E. skiltonianus amblygrammus* from Fort Humboldt, Calif.; and *E. skiltonianus brevipes* from Fresno, Cal.

CORRINGTON, JULIAN D. 1927. Field notes on some amphibians and reptiles from Biloxi, Miss. Copeia, 1927, No. 165, pp. 98-102.
Records *Eumeces fasciatus* as common.

——— 1929. Herpetology of the Columbia, South Carolina, region. Copeia, No. 172, 1929, pp. 58-83.
Notes on *Eumeces fasciatus*.

COUES, ELLIOT. 1875. Synopsis of the reptiles and batrachians of Arizona with critical and field notes, with an extensive synonymy. Rept. Geog. & Geol. Expl. Surv. west 100th Merid., under Lt. Wheeler, V, Zoôlogy, pp. 585-633, pls. XVI-XXV.
Eumeces obsoletus listed.

COUES, ELLIOT, AND YARROW, H. C. 1878. Notes on the herpetology of Dakota and Montana. Bull. U. S. Geol. & Geog. Surveys Terr., IV, No. 1, 1878, pp. 259-291.
Lists *Eumeces septentrionalis* on page 278.

——— 1878. Notes on the natural history of Fort Macon, N. C., and vicinity. No. 4. Proc. Acad. Nat. Sci. Phila., 1878, pp. 21-28.
Eumeces fasciatus listed.

CRAGIN, F. W. 1880. A preliminary catalogue of Kansas reptiles and batrachians. Trans. Kans. Acad. Sci., VII, 1879-1880, pp. 112-119.
Mentions *Eumeces septentrionalis* from Neosho Falls; *E. obsoletus*, Douglas county; *E. guttulatus*, Manhattan; and *E. fasciatus*, Fort Riley.

——— 1880*a*. Supplementary list comprising species now known as extralimital but more or less likely to be found in Kansas. Trans. Kansas Acad. Sci., VII, 1879-1880, pp. 119-120.
Lists *Eumeces multivirgatus*, *leptogrammus*, and *inornatus*.

——— 1885. Second contribution to the herpetology of Kansas with observations on the Kansas fauna. Trans. Kansas Acad. Sci., IX, 1883-1884, pp. 136-140.
E. fasciatus listed, and *E. multivirgatus* reported from Neosho Falls, p. 138. This latter is probably *septentrionalis*.

——— 1885*a*. Recent additions to the list of Kansas reptiles and batrachians, with further notes on species previously reported. Bull. Washburn College Lab. Nat. Hist., I, 1885, No. 3, pp. 100-103.
Reports *Eumeces multivirgatus* and *E. fasciatus*. Virtually the same data given as the preceding paper presents.

CUVIER, GEORGES. 1829. Regne Animal, 2d Edition. II., 3d Ed. "Griffiths," 1831.
Type description of *Scincus cyprius*, p. 62.

CZERNOV, S. 1926. Sur la connaisance de la herpetologique d'Armenie et de la contree du Nakhiczevan. Bull. Sci. de l'Inst. Expl. Reg. du Caucase du Nord, V, 1926, pp. 63-72.
Eumeces schneideri reported from the Caucasus.

DAUBENTON, LOUIS-JEAN-MARIE. 1784. Les Quadrupèdes Ovipares, et les Serpens. Vol. II of l'Encyclop. Method.
Mentions Lézard à queue bleue and Le lézard strié.

DAUDIN, F. M. 1802. Historie Naturelle des Reptiles. Vols. I-VIII. Vol. IV (1802-1803).
Type description given of *Scincus schneiderii*, p. 291. Treats of *Scincus quinquelineatus* (p. 272, pl. LV, fig. 1); *Scincus laticeps* (p. 301); and *Scincus tristatus* (p. 292), with descriptions and discussion.

DAVID, ARMAND. 1872. Journal d'un voyage dans le Centre de la Chine et dans le Thibet Oriental. Nouv. Arch. Hist. Nat. Paris, VIII, Bull., 1872, pp. 3-137.
Mentions *Eumeces quadrilineatus*.

——— 1875. Journal de mon Troisieme Voyage d'Exploration dans l'Empire Chinois, I and II. Paris.
Mentions *Eumeces quadrilineatus*.

DAVIS, N. S., and RICE, F. L. 1883. List of the Batrachia and Reptilia of Illinois. Bull. Chicago Acad. Sci., I, No. 3, 1883, pp. 23-32.
Records *Eumeces obsoletus* from central and southern Illinois. These are very doubtful records. Also *E. fasciatus*.

——— 1883*a*. North American Batrachia and Reptilia found east of the Mississippi river. Illinois State Lab. Nat. Hist. Bull., V, 1883, pp. 1-64.
Lists the following species with short descriptions: *septentrionalis, egregius, onocrepis, anthracinus* and *fasciatus*. The record of *E. obsoletus* for Illinois (Forbes) is probably incorrect.

DECKERT, RICHARD. 1918. A list of reptiles from Jacksonville, Fla. Copeia, No. 54, pp. 30-33.
Lists *Plestiodon fasciatus*.

DEKAY, JAMES E. 1842. Zoölogy of New York, or the New York fauna, Part 3. Reptilia and Amphibia. Albany, 1842, pp. 1-98, pls. 1-23.
Scincus fasciatus described with figure (pl. 8, fig. 17). Notes on extralimital species are given.

DERINGEN, K. M. 1901. [Materials for the herpetology of S. W. Transcaspia and the neighborhood of Trebizond]. Russian text. Ann. Mus. St. Petersb., VI, pp. 84-111.

——— 1905. [A note on lizards and snakes from the Transcaspian province]. Russian text. Proc. St. Petersburg Naturalists Soc., XXXVI, Pt. 1.
E. scutatus listed from Andera, Transcaspia.

DE STEFANO, G. 1903. I Sauri del Quercy appartenenti alla collezione Rossignol. Atti. Mus. Milan, XLII, pp. 382-417, pls. IX, X.
Plestiodon cadurcensis Filhol. (fossil).

DITMARS, R. L. 1903. Observations on lacertilians. Ann. Rept. N. Y. Zoöl. Soc. for 1903, VIII, pp. 146-160.
Notes on incubation of eggs in *Eumeces quinquelineatus*.

——— 1915. The reptile book. Doubleday, Page Co., 1915, pp. 1-472.
Treats in detail many American species. The following appear: *Eumeces multivirgatus, quinquelineatus, leptogrammus, obsoletus, skiltonianus, gilberti, septentrionalis, egregius, anthracinus, tetragrammus, pluvialis, pachyurus, brevilineatus* and *guttulatus*. Several species are figured.

DOEDERLEIN, L. 1881. Die Liu-Kiu Insel Amami Oshima. Mitth. Deutsch Ost-Asiens Ges., III (1880-1884), pp. 140-156.
Also issued as a separate in Yokohama, according to Stejneger, Bull. U. S. Nat. Mus., 58, p. 535.
Reports *Eumeces quinquelineatus* from Amami Oshima.

DOUMERGUE, F. 1901. Essai sur la faune Erpétologique de l'Oranie, avec des tableaux analytiques et des notions pour la détermination de tous les Reptiles et Batraciens du Maroc, de l'Algérie et de la Tunisie. Bull. Soc. Geogr. Archeol. Oran, XIX-XXI, 1899-1901, 27 pls. (Also separately issued, pp. 1-404.)
Gives *Eumeces algericnsis meridionalis* (pl. XVI, fig. 3) from Prov. Oran and Morocco.

DONDORFF. 1798. Zoölogische Beitrage, III, p. 120, No. 24, and p. 122, No. 40. *Lacerta quinquelineata* and *Lacerta fasciata*.

DUGÈS, ALFREDO. 1870. Catálogo de animales Vertebrados observados en la República Mexicana. La Naturaleza, I, 1869-1870, pp. 137-145.
Lists *Plesthiodon* (sic) *quinquelineatum*. Agujilla, Salamanquesa and Zetzaucoatl, given as the common names.

——— 1884. Dos réptiles de Mexico. La Naturaleza, (1), VI, 1882-1884, pp. 359-362, pl. IX, fig. 1a.
Redescribes *Eumeces dugesii* Thominot from new material in his own collection. The species is figured in colors at natural size.

——— 1889. Francisco Hernandez, La Naturaleza, (2), I, pp. 282-288.
Dugès states that the native name Tetzauhcoatl published by Hernandez in "Nova Plantarum, animalium, etc.," Rome, MDCLI, for a Mexican lizard, refers to *Eumeces lynxe*.

——— 1891. "Eumeces altamirani A. Dug." La Naturaleza, (2) I, 1887-1890, pp. 485-486, pl. XXII.
Describes as new *Eumeces altamirani* from "Las regiones cálidas del Estado de Michoacán. He also proposes the generic designation *Platypholis* for the species.

——— 1897. "Eumeces rovirosae A. Dug." La Naturaleza, (2), II, 1897, pp. 298-299, pl. XIII.
Eumeces rovirosae is described as new from "Mineral de Santa Fé, Chiapas." This is a young specimen of *Eumeces sumichrasti* Cope.

——— 1897a. Lista de algunos reptiles y batracios de Tabasco y Chiapas. La Naturaleza, (2), II, pp. 375-377.
Lists *Eumeces rovirosae* from the type locality.

——— 1897b. Reptiles y batracios de los E. U. Mexicanos. La Naturaleza, (2), II, 1896, pp. 497-485.
Eumeces altamirani listed from Apatzingan (Michoacán), presumably the type locality, the specimen referred to being the type and the only specimen known; *E. dugesi*, from Chiapas, Tanganciquaro, Patambán; *E. rovirosae*, from the type locality; *E. lynxe*, from Guanajuato; *Plesthiodon* (sic) *callicephalum*, from several localities.

DUMÉRIL, AUG. Notice Historique sur la Menagerie des Reptiles du Museum d'Histoire Naturelle. Arch. du Museum, VII. pp. 193-319.
Plestiodon aldrovandii listed on p. 219.

DUMÉRIL, A. M. C., and BIBRON, G. 1839. Erpétologie général ou Histoire Naturelle complète des Reptiles, V, 1830, pp. 1-855..
Of the three species which Wiegmann placed in his *Eumeces*, these authors choose a type, *Scincus punctatus*, and place the form *Scincus pavimentatus* as presumably the type of a new subgenus, *Plestiodon*. This

form is treated under the name *Plestiodon aldrovandii*. Four other forms are recognized: *P. laticeps, sinensis, quinquelineatum* and *pulchrum*.

DUMÉRIL, M. C., and DUMÉRIL, AUG. 1851. Catalogue Méthodique de la Collection des Reptiles du Muséum d'Histoire Naturelle de Paris. Paris, 1851, pp. 1-224.

The following species are included: *Plestiodon aldrovandii, Plestiodon laticeps, P. sinense, P. quinquelineatum, P. pulchrum*.

DUNN, EMMET REID. 1915. List of the amphibians and reptiles observed in the summers of 1912, 1913 and 1914 in Nelson county, Virginia. Copeia, No. 18, May 15, 1915, pp. 5-7.

——— 1917. Reptile and amphibian collections from the North Carolina mountains, with special reference to salamanders. Bull. Amer. Mus. Nat. Hist., XXXVII, 1917, pp. 593-634, pls. LVII-LXI.

Gives records of *Plestiodon quinquelineatum*.

——— 1918. A preliminary list of reptiles and amphibians of Virginia. Copeia, No. 53, 1918, pp. 16-27.

Locality records for *Plestiodon fasciatus*.

——— 1920. Some reptiles and amphibians from Virginia, North Carolina, Tennessee and Alabama. Proc. Biol. Soc. Washington, XXXIII, 1920, pp. 129-138.

Locality records for *Plestiodon fasciatus*.

——— 1933. A new lizard from Nicaragua. Proc. Biol. Soc. Wash., XLVI, Mar. 24, 1933, pp. 67-68.

Eumeces managuae is described as new from a specimen collected on the aviation field at Managua, Nicaragua, by James H. Ivy.

DUNN, EMMET REID, and EMLEN, JOHN T., 1932. Reptiles and amphibians from Honduras. Proc. Acad. Nat. Sci. Phila., LXXXIV, Mar. 22, 1932, pp. 21-32.

Eumeces schmidti is described as new from specimens collected at Tela, Honduras, by J. A. G. Rehn.

DURY, RALPH. 1933. Notes on some Kentucky amphibians and reptiles. Bull. Baker-Hunt Foundation Museum, Williams Natural Hist. Collection, No. 1, Nov., 1933, pp. 1-22.

Lists *Eumeces fasciatus* and *Eumeces laticeps*.

DWIGUBUSKI, I. 1932. Opyt Estestvennoy estoriny vseh Jevotnye Rocciskoy Emperii. Pt. III, 1832.

On page 15 (fig. 4) is given *Scincus officinalis* (non Laurenti).

EICHWALD, ED. 1839. De dubus novis amphibiorum speciebus. Bull. Soc. Imp. Naturalistes Moscow, II, 1839, pp. 303-307.

The type description of *Euprepis princeps* appears. The type locality is "In ora caspia occidentali, ad montes praesertim Talyschenses."

——— 1851. Naturhistorische Bemerkungen über Algiers und den Atlas. Nouv. Mem. Soc. Nat. Moscow, (2), IX, 1851, pp. 414-444.

Plestiodon aldrovandii given on p. 437.

ELLIS, MAX M. 1917. Amphibians and reptiles of the Douglas Lake (Michigan) region. 19th Rept. Mich. Acad. Sci., 1917, pp. 45-63.

Eumeces quinquelineatus listed.

ELLIS, MAX M., and HENDERSON, JUNIUS. 1913. The Amphibia and Reptilia of Colorado. Part I. Univ. Colo. Studies, X, No. 2, 1913, pp. 39-130, pls. 1-8.

Lists Colorado species of *Eumeces*. A doubtful figure of *E. obsoletus* is given on pl. 3 (figs. 15-16). This appears to be *E. multivirgatus*.

ELPATJEWSKY, V. S., and SABANEJEW, L. L. 1906. Zur herpetologischen Fauna des Russischen Ergänzungen Reichs. Zool. Jahrb. Jena, Abt. f. Syst., XXIV, pp. 247-264, pl. 2.

E. latiscutatus is given on p. 255 (Taf. 18, fig. 3) from Sinus S-tae Olgae, S-ti Vladimir, S'nus Imperator in Siberia Orient. The identification is not certain.

ERWIN, RICHARD P. 1929. List of Idaho reptiles and amphibians in the Idaho State Historical Museum. 11th Biennial Rept. Board Trustees State Historical Soc. Idaho, 1927-1928, pp. 31-33.
Lists *Eumeces skiltonianus* from southwestern Idaho.

FAN, T. H. 1931. Preliminary report of reptiles from Yaoshan, Kwangsi, China. Bull. Dept. Biol. Coll. Sci., Sun Yatsen Univ., May, 1931, pp. 1-154.
Eumeces chinensis described at length, with records of its collection at Loshiang and Kutchen.

FERRARI-PEREZ, FERNANDO. 1886. Catalogue of animals collected by the geographical and exploring commission of the Republic of Mexico. Part III. Reptiles. Proc. U. S. Nat. Mus., IX, 1886, pp. 182-199.
Lists *Eumeces furcirostris* from Puebla.

FILIPPI, F. DE. 1864. Riassunto del Catalogo degli Animali Vertebrati delle Provincie caucasiche e delle Persia accidentale. Att. Soc. Ital. Sc. Nat., VII, Riun. Straord. a Biella, 1864, Sept., pp. 184-186.

——— 1865. Note di un viaggio in Persia nel 1862. Milano, 1865.
Mentions *Plestiodon aldrovandii*, p. 354.

FINN, F. 1898. Note on a specimen of the rare scincoid lizard, *Eumeces blythianus* (Anderson) from the Afridi country; with exhibition of the type specimen. Proc. Asiat. Soc. Bengal, 1898, pp. 189-190.

FISCHER, J. G. 1884. Herpetologische Bemerkungen. Abh. Geb. Naturw. herausg. Naturw. Ver. Hamburg, VIII, Heft 2, pp. 1-6, pl. VII, figs. 1a-1d.
Eumeces schwartzei is described as new from a specimen accidentally carried to Hamburg in a load of dyewood from "Laguna de Terminos (Campeche Bai)," Mexico. The species is figured on plate VII, figs. 1a-1d.

——— 1886. Abh. Naturw. Ver. Hamburg, IX, 1866, pp. 51-57, pls. I-III.

FISCHER, JOH. VON. 1881. Die Tupfen Echse, Plestiodon aldrovandii Wagl. in der Gefangschaft. Zool. Gart., No. 10, 1881, pp. 297-303.

——— 1887. Friichte fressent, in Humboldt (Dammer), 1887, Heft I, pp. 24-25.
Plestiodon aldrovandii mentioned.

FITZINGER, L. I. 1826. Verzeichniss der im K. K. Zoölogisch Museum zu Wien befindlichen. In Neue Classification der Reptilien. Wien, 1826, pp. 1-66, pl. 1.
Lists *Mabouia quinquclineata*, pp. 23, 52.

——— 1843. Systema Reptilium. 1843, pp. 1-106.
Lacerta quinquelineata Linné designated as the type of *Plestiodon* (p. 22).

FLOWER, STANLEY S. 1896. Notes on a collection of reptiles and batrachians made in the Malay Peninsula in 1895-'96, with a list of the species recorded from that region. Proc. Zoöl. Soc. London, 1896, pp. 856-914, pls. XLIV-XLVI.
Eumeces chinensis reported as doubtful from the Malay Peninsula.

——— 1933. Notes on the recent reptiles and amphibians of Egypt, with a list of the species recorded from that kingdom. Proc. Zoöl. Soc. London, Sept. 20, 1933, pp. 735-851, 1 map.
Gives notes on *Eumeces schneidcrii*, pp. 787-788.

FORCE, EDITH R. 1930. The reptiles and amphibians of Tulsa county, Oklahoma, and vicinity. Copeia, 1930, No. 2, pp. 25-39.
Eumeces septentrionalis, obsoletus, anthracinus and *fasciatus* are listed.

FOWLER, HENRY W. 1906. The amphibians and reptiles of New Jersey. Ann. Rept. New Jersey State Museum, 1906, Pt. II. pp. 25-250.
Notes on *Eumeces fasciatus*.

——— 1915. Cold-blooded vertebrates from Florida, the West Indies, Costa Rica and eastern Brazil. Proc. Acad. Nat. Sci. Phila., LXVII, 1915, pp. 244-269.

Reports *Eumeces longirostris* from Ducking Stool, Bermuda, and *Eumeces fasciatus* from Key West.

——— 1925. Records of amphibians and reptiles for Delaware, Maryland and Virginia. I. Delaware. II. Maryland. Copeia, No. 145, 1925, pp. 57-64.
Lists *Plestiodon fasciatus*.

FRITZE, ADOLPH. 1892. Die Fauna von Yezo im Vergleich zur Fauna des übrigen Japan. Mitth. Deutsch. Ost-Asiens Ges., V, 1889-1892.
Lists *Eumeces quinquelineatus* from Yezo.

——— 1894. Die Fauna der Liu-Kiu-Insel Okinawa (Japan). Zoöl. Jahrb. Syst., VII, 1894, pp. 852-926. (Also issued as a separate with pagination 1-77.)
The specimens of *Eumeces marginatus* from Yezo are doubtless E. *latiscutatus*.

GADOW, HANS. 1905. Distribution of Mexican amphibians and reptiles. Proc. Zoöl. Soc. London, 1905, pp. 191-244.
Lists *Eumeces fuscirostris* (sic) from Nevada de Colima (this is probably a lapsus for E. *brevirostris*, which is listed from the same locality and elevation [7,000 ft.]) and *E. lynxe* (also spelled *lynce*) from Nevada de Colima and Omilteme. These records are doubtful for the latter species.

GANNETH, HENRY. 1904. List of altitudes in Mexico. Bull. International Bur. Amer. Repubs., Sept., 1904.

GARMAN, H. 1894. A preliminary list of the vertebrate animals of Kentucky. Bull. Essex Inst., XXVI, 1894, pp. 1-63.
Eumeces anthracinus listed as probably occurring in the state; *E. fasciatus* reported as common.

GARMAN, SAMUEL. 1884. North American reptiles and batrachians. A list of species occurring north of the Isthmus of Tehuantepec, with references. Bull. Essex Inst., XVI, 1884, pp. 1-46.
Lists under the genus *Eumeces* 18 species. He includes (with question mark)? *Diploglossus millepunctatus* O'Shaug. from N. W. North America.

——— 1885. Reptiles of Bermuda. Bull. U. S. Nat. Mus., No. 25, 1885, Pt. 4, pp. 285-303.
Gives a detailed description, and reviews the history of *Eumeces longirostris* Cope.

——— 1887. Reptiles and batrachians from Texas and Mexico. Bull. Essex Inst., XIX, pp. 119-138.
Eumeces lynxe reported from Mountains of Alvarez (San Luis Potosí), Mexico.

GEE, N. GIST. 1930. A contribution toward a preliminary list of reptiles recorded from China. Bull. Dept. Biol. Yenching Univ., I, 1929-1930, pp. 53-84.
Many locality records given from other publications.

GEOFFROY SAINT-HILLAIRE, ETIENNE [also Geoffroy, Isidore and Audouin, V.] 1827. Reptiles in Savigny, Description of Egypt, 1802-1830? pp. 115-184.
The reptile part was published as follows: pp. 115-120, Etienne Geoffroy Saint-Hillaire; pp. 121-160, Isidore Geoffroy Saint-Hillaire; pp. 161-184, V. Audouin. This work gives very good plates of two species: pl. III, fig. 3, of *Scincus schneiderii*, and pl. IV, fig. 4, of *Scincus pavimentatus*.

GEORGI, J. G. 1800. Geographisch-Physikalische und Naturhistorische Beschreibung des Russischen Reiches. T. 3, B. VI, 1800. Bisher bekannt gewordene Thierarten Königsberg, 1800.
Mentions *Lacerta scincus* (non Linnaeus).

GERVAIS, P. 1836. Enumeration de quelque especes de Reptiles provenant de Barbarie. Ann. Sci. Nat., (2), VI, 1836, pp. 308-313.
Scincus (*Plestiodon*) *cyprius* (non Cuvier) listed, p. 309.

——— 1848. Sur les Animaux Vertebres de l'Algerie. Ann. Sci. Nat., (3), X, 1848, pp. 204-205.

GIBBS, MORRIS, NOTESTEIN, F. N., and CLARK, H. L. 1905. A preliminary list of the amphibians and reptiles of Michigan. 7th Ann. Rept. Mich. Acad. Sci., 1905, pp. 109-110.
Lists *Eumeces fasciatus*.

GILLIAMS, JACOB. 1818. Description of two new species of Linnaean Lacerta. Journ. Acad. Nat. Sci. Phila., Vol. I, Pt. II, 1818, pp. 460-462, pl. XVIII, fig. 2.
Type description of *Scincus erythrocephalus*. The type locality is Maryland. Type collected by James Keech. The figure is poor.

GLOYD, H. K. 1928. The amphibians and reptiles of Franklin county, Kansas. Trans. Kansas Acad. Sci., 1928, pp. 115-141.
Data given on the habits of *Eumeces obsoletus, anthracinus* and *fasciatus*.

——— 1932. The herpetological fauna of the Pigeon Lake region, Miami county, Kansas. Papers Mich. Acad. Sci. Arts Letters, XV, 1931, pp. 389-409, map 3, pls. XXX-XXXII.

GMELIN, JEAN-FREDERIC. 1788. Systema naturae Ed. 13, 1788.
Lacerta quinquelineata and *Lacerta fasciata* given.

GODET, D. T. L. 1860. Bermuda. 1860.
Discusses the Bermuda lizards on p. 251. Mentions *Scincus fasciatus* and *Scincus ocellatus* presumably as occurring in Bermuda.

GOODE, G. BROWN. 1877. A preliminary catalogue of the reptiles, fishes and leptocardians of the Bermudas, with the description of four species of fishes believed to be new. Amer. Journ. Sci., (3), July to Dec., 1877, pp. 289-298.
Eumeces longirostris listed, p. 290.

GRAENICHER, S. 1911. Some records of Wisconsin lizards. Bull. Wisc. Nat. Hist. Soc., IX, pp. 78-81.
Discusses the occurrence of *Eumeces septentrionalis* in Wisconsin, and gives numerous records. *Eumeces quinquelineatus* is reported from various localities.

GRANT, CHAPMAN. 1927. The blue tailed skink of Kansas, *Eumeces guttulatus*. Copeia, No. 164, July-Sept., 1927, pp. 67-69.
An interesting account of a young specimen of *E. obsoletus*.

GRAVENHORST, J. L. C. 1851. Uber die im Zoologischen Museum der Universität Breslau befindlichen Wirtelschleichen (Pseudosaura) Krüppelfüssler (Brachypoda) und einige andere denselben verwandte Reptilien, aus den Zünften der Schleichen und Dickzüngled. Nova. Acta Akad. Leop. Carol., XXIII, 1851, I, pp. 350-354, pl. XXXV.
Under the name *Plestiodon quinquelineatus* four specimens are discussed. No. 1 appears to be *E. inexpectatus*, while the other three specimens are said to be from Mexico. The descriptions are such that the species cannot be definitely determined. The *Euprepes amantus* Gravenhorst (from Surinam) is not *Eumeces*.

GRAY, J. E. 1831. A synopsis of the species of class Reptilia. Appendix in Griffith's Cuvier's Animal Kingdom, IX, 1831, pp. 1-110.
Lists *Tiliqua cyprinus* Cuv. from Egypt. The description states "Scales smooth, tail longer than the body, brown, with a pale line on each side." *Tiliqua quinquelineatus* and *bicolor* are also listed.

——— 1838. Catalogue of the slender-tongued Saurians, with descriptions of many new genera and species. Ann. Mag. Nat. Hist., (1), II, 287-293.
Brief type description of *Eumeces chinensis*.

——— 1845. Catalogue of the specimens of lizards in the collection of the British Museum. 1845, pp. 1-xxviii, 1-289.
Type description of *Plestiodon Bellii*, from an unknown locality, given; also are listed *P. laticeps, quinquelineatum, pulchrum, chinensis* and *auratus*, pp. 90-92.

GREEN, JACOB. 1818. Description of several species of North American amphibia, accompanied with observations. Journ. Acad. Nat. Sci. Phila., I, Pt. 2, Aug., 1818, pp. 348-359, pl. XVI, fig. 2.

Lacerta quinquelineatus is described, with a figure which cannot be identified. This appears to be of a specimen of *E. inexpectatus*. The *Lacerta fasciata* listed is a specimen of *Sceloporus undulatus*.

GRINNELL, JOSEPH. 1908. The biota of the San Bernardino mountains. Univ. Calif. Publ. Zoöl., V, No. 1, 1908, pp. 1-170, pls. 1-24. (Reptiles pp. 160-170).

Reports *Eumeces skiltonianus* and refers a doubtful specimen to *E. gilberti*.

GRINNELL, JOSEPH, and CAMP, CHARLES LEWIS. 1917. A distributional list of the amphibians and reptiles of California. Univ. Calif. Publ. Zoöl., XVII, July 11, 1917, pp. 127-208, 14 text figs.

Gives the distribution of *Eumeces skiltonianus*, based on previous records.

GRINNELL, JOSEPH, DIXON, JOSEPH, and LINSDALE, JEAN M. 1930. Vertebrate natural history of a section of northern California through the Lassen Peak region. Univ. Calif. Publ. Zoöl., 35, 1930, pp. 1-594, 181 text figs.

Eumeces skiltonianus habitat records given, p. 148.

GRINNELL, JOSEPH, and GRINNELL H. W. 1907. The reptiles of Los Angeles county, California. Throop Inst. Bull., No. XXXV, 1907, pp. 1-64.

Gives a detailed account of *Eumeces skiltonianus*, p. 35, fig. 12.

GRINNELL, JOSEPH, and STORER, TRACY IRWIN. 1921. Reptiles and amphibians of Yosemite National Park, in Hall's Handbook of Yosemite National Park. Putnam, 1921, pp. 175-182.

Lists *Eumeces skiltonianus* (=*E. gilberti*).

——— 1924. Animal life in the Yosemite. Univ. Calif. Press, Berkeley, Cal., 1924, xviii + 752 pp., pls. i-lx, figs. 1-65, maps.

Discusses *Eumeces skiltonianus*, regarding *E. gilberti* a synonym.

GUICHENOT, A. 1850. Exploration Scientifique d l'Algerie pendent les Annees 1840-1842. Reptiles. Paris, 1850, 4to, 130 pp., 4 pls.

? *Plestiodon aldrovandii* mentioned (p. 17).

GUILLET, C. 1902. Note on the blue-tailed lizard. Ottawa Naturalist, XVI, p. 239.

Records *Eumeces fasciatus* from Ontario, Canada.

GULLIVER, GEORGE. 1875. Observations on the sizes and shapes of the red corpuscles of vertebrates. Proc. Zoöl. Soc. London, 1875, pp. 474-495.

On page 488 is given the diameter of the corpuscles of *Plestiodon auratus*. The largest diameter is $\frac{1}{1455}$ of an inch, the smallest, $\frac{1}{2400}$.

GÜNTHER, ALBERT. 1860. On new reptiles and fishes from Mexico. Proc. Zoöl. Soc. London, 1860, pp. 316-322.

Mabouia brevirostris, from Oaxaca, Mexico, is described as new.

——— 1860*a*. Ann. Mag. Nat. Hist., 1860, VI, p. 442.

——— 1864. The reptiles of British India. London, pp. i-xxvii, 1-444, pls. I-XXVI.

Treats the species of *Eumeces* under the generic name of *Mabouia*. *Mabouia quadrilineata* is figured on pl. X (fig. E); *Mabouia chinensis*, figured on pl. X (fig. F), is *Eumeces elegans*.

——— 1864*a*. Report on a collection of reptiles and fishes from Palestine. Proc. Zoöl. Soc. London, 1864, pp. 488-493.

Lists *Plestiodon auratus* Schn. from the Dead Sea, p. 489.

——— 1866. Zoöl. Record, Reptilia, p. 123.

Notes variation in *Plistodon aldrovandii*.

——— 1885-1902. Biologia Centrali-Americana. Reptilia and Batrachia. 1885-1902 (part dealing with *Eumeces* dated Oct., 1885), pp. i-xx, 1-326, pls. 1-76.

On pp. 32-33 are listed *E. lynxe, brevirostris* (pl. XXII, fig. B), *bocourti* (= *humilis*) (pl. XXII, fig. C), *callicephalus, sumichrasti, dugesii, schwartzei* and *furcirostris.*

——— 1888. On a collection of reptiles from China. Ann. Mag. Nat. Hist., (6), I, pp. 165-172.

Lists *Lygosoma elegans* (= *Eumeces elegans*) from mountains near Kiu Kiang on the "Yantsze" river, China.

——— 1889. Third contribution to our knowledge of reptiles and fishes from the Upper Yangtsze-Kiang. Ann. Mag. Nat. Hist., (6), IV, pp. 218-229.

Eumeces xanthi is described as new from Ichang, China.

——— 1896. Report on the collections of reptiles, batrachians and fishes made by Messrs. Potanin and Berezowski in the Chinese Provinces Kansu and Szechwan. Ann. Mus. Zoöl. St. Petersbourg, I, 1896, pp. 199-219.

Eumeces quadrilineatus and *E. xanthi* mentioned.

HALLOWELL, EDWARD. 1852. On a new genus and three new species of reptiles inhabiting North America. Proc. Acad. Nat. Sci. Phila., 1852, pp. 206-209.

The genus *Lamprosaurus,* with the type species *guttulatus,* is described from a specimen from Fort Fillmore below the Jornada del Muerte, New Mexico.

——— 1853. Reptiles, in Sitgreaves', Report of an expedition down the Zuni and Colorado rivers. 1853, pp. 106-147.

Contains a detailed description of *Plestiodon obsoletum* B. & G. from near the type locality, and a redescription of *Lamprosaurus guttulatus.*

——— 1854. Descriptions of new reptiles from California. Proc. Acad. Nat. Sci. Phila., 1854, pp. 91-97.

Description of *Eumeces* sp. from a specimen "from Lower California, near Mojave river, and in San Bernardino Valley." This is evidently intended for a description of a new species, but the author fails to give a name. This specimen later forms the type of *Eumeces quadrilineatus.*

——— 1856. On several new species of reptiles in the collection of the Academy of Natural Sciences. Proc. Phila. Acad. Nat. Sci., 1856, pp. 153-156.

——— 1856*a*. Notes on a collection of reptiles from Kansas and Nebraska, presented to the Academy of Natural Sciences, by Dr. Hammond, U. S. A. Proc. Acad. Nat. Sci. Phila., 1856, pp. 238-253.

Discusses variation in *Plestiodon obsoletum.*

——— 1856*b*. Notes on the collection of reptiles from the neighborhood of San Antonio, Tex., recently presented to the Academy of Natural Sciences by Doctor Heerman. Proc. Phila. Acad. Nat. Sci., 1856, pp. 306-310.

Gives the type description of *Plestiodon vittigerum.* Type locality stated as "neighborhood of Flint, Mich."

——— 1857. Description of several new North American reptiles. Proc. Acad. Nat. Sci. Phila., 1857, pp. 215-216.

Type description given of *Eumeces multivirgatus* from Posa creek, 460 miles west of Fort Riley, Kan. The label on the type specimen actually reads Pou (or Cow) creek rather than "Posa" creek. *Lamprosaurus guttulatus* is referred to the genus *Plestiodon.*

——— 1859. Report upon reptiles of the route. Expl. Surv. for a Route to Pac. Ocean, Williamson, X, 1853, Pt. IV, Zoölogy Report, 1859, pp. 1-25, pls. I-X.

Type description of *Eumeces quadrilineatus* appears. The type locality is "Southern part of Upper California, near Mojave river, and in San Bernardino Valley." Pl. IX, fig. 3, gives line drawings of the head.

——— 1860. Notice of some new and rare species of Scincidae in the collection of the Academy of Natural Sciences of Philadelphia. Trans. Amer. Philos. Soc., XI (N. S.), pp. 71-82, pls. III-IV.

Reports *Eumeces quadrilineatus* from Astoria, Columbia river; *Plestiodon harlani* (= *Euprepes harlani*) from Liberia; and *Plestiodon sinense?* from Ningpo, China.

——— 1860*a*. Report upon the Reptilia of the North Pacific exploring expedition under the command of Captain John Rogers. Proc. Acad. Nat. Sci. Phila., 1860, pp. 480-510.
Separates the Japanese five-lined skink from the American forms under the name *Plestiodon latiscutatus*. *Plestiodon marginatus* is described from "Ousima," Japan and Loo-Choo Islands, and *Eumeces quadrivirgatus* (= *E. quadrilineatus* Blyth) is described as new from Hong-Kong Island.

HARLAN, RICHARD. 1824. Description of a new species of Scincus. Journ. Acad. Nat. Sci. Phila., 4, Pt. 2, 1824, pp. 286-288, pl. XVIII.
Type description of *Scincus bicolor* is given, with plate XVIII, fig. 1. This name is doubtless a synonym of *E. laticeps*.

——— 1829. Genera of North American Reptilia, and a synopsis of the species. (Continued from Volume V.) Journ. Acad. Nat. Sci. Phila., VI, Pt. 1, 1829, pp. 7-38.
Lists *Scincus quinquelineatus, erythrocephalus* and *bicolor*, pp. 10-11.

——— 1835. Genera of North American Reptilia, and a synopsis of the species. Med. Phys. Researches, 1835, pp. 84-161.
Lists *Scincus americanus*, using Petiver's name (Gazophylacii Naturae et Artis, 1711, tab. 69, fig. 13) for *Eumeces laticeps*. Also lists *Scincus bicolor* Harlan, *Scincus quinquelineatus* and *Scincus erythrocephalus*.

HARPER, FRANCIS. 1930. Notes on fishes, amphibians and reptiles of Randolph county, Georgia. Copeia, 1930, No. 4, Dec., pp. 152-154.
Lists *Eumeces fasciatus*.

HALTOM, WILLIAM L. 1931. Alabama reptiles. Mus. Paper No. 11, Alabama Mus. Nat. Hist. Univ. Alabama, 1931, pp. 1-145, pls. 1-39, text figs. 1-57.
Records the type of *Eumeces pluvialis* from the type locality with a copied figure and description. *E. fasciatus* is listed with numerous localities.

HARTMAN, F. A. 1906. Food habits of Kansas lizards and batrachians. Trans. Kan. Acad. Sci., XX, 1906, pp. 225-229.
Eumeces obsoletus and *guttulatus* discussed.

HARTWEG, NORMAN. 1931. Apparent ovoviviparity in the Mexican skink *Eumeces lynxae* Wiegmann. Copeia, 1931, No. 2, p. 61.
Ovoviviparity described in specimens from Guerrero, Hidalgo, Mexico.

HATTA, S. 1913. Zur Tiergeographie von Hokkaido. Zoöl. Ann. XLIII, pp. 27-36.
Lists *Eumeces latisculatus* (sic) from Hokkaido.

HAY, O. P. 1887. A preliminary catalogue of the Amphibia and Reptilia of the state of Indiana. Journ. Cincinnati Soc. Nat. Hist., 1887, pp. 59-69.
Gives records for *Eumeces fasciatus*.

——— 1887*b*. The amphibians and reptiles of Indiana. Indiana State Bd. of Agri., Ann. Rept. for 1886, XXVIII, pp. 201-223.
Remarks on *Eumeces fasciatus*.

——— 1892. The batrachians and reptiles of the state of Indiana. 17th Ann. Rept. Ind. Dept. Geol. & Nat. Resources, 1891, pp. 409-610, pls. 1-3.
Under the name *fasciatus* are discussed the habits of this species and those of *laticeps*.

HAYDEN, F. V. 1863. On the geology and natural history of the Upper Missouri. Trans. Amer. Philos. Soc., XII, 1862, pp. 1-218, 4 maps.
Reptiles discussed on pp. 177-178. *Leptogrammus, multivirgatus, inornatus* and *septentrionalis* listed.

HEDIGER, H. 1928. Die Tierwelt auf einer Marokkanischen Farm. Blatt. f. Aquar.-Terr.-kunde, XXXIX, No. 20, 1928.
Eumeces algeriensis is listed from Raba.

HEERMAN, A. L. 1859. Report upon reptiles of the route No. I. Expl. Surv. R. R. Route Pac. Ocean, 1853, X, Pt. 4, Zoölogical Rept., 1859, pp. 24-25, pls. I-X.
Lists the type specimen of *Eumeces quadrilineatus*.

HEMPRICHT, F. G., and EHRENBERG, C. G. 1899. Symbolae physicae seu Icones adhuc ineditae corporum naturalium novorum aut minus cognitorum quae ex itineribus per Lybiam, Egyptias, Nubiam, Dongolem, Syriam, Arabiam et Habessiniam. . . Zoologica, Berlin, 1899.
Figures *Eumeces schneiderii* on pl. IV, fig. 4.

HENSHAW, SAMUEL. 1904. Fauna of New England, I. List of Reptiles. Occ. Papers Boston Soc. Nat. Hist., VII, 1904, pp. 1-13.
Gives records of *Eumeces quinquelineatus*.

HERRERA, ALFONSO L. 1895. Catálogo de la colección de reptiles y batracios del Museo Nacional. México, Imprenta del Museo Nacional, 1895, pp. 1-66.

——— 1904. Catálogo de la colección de reptiles y batracios del Museo Nacional. México, Imprenta del Museo Nacional, 1904, pp. 1-65.
Exactly the same pagination as first edition save an occasional shift in the lines. The errata of the first are omitted in the second, the corrections being made in the text. Lists *E. dugesi* and *fasciatus*.

HERRICK, C. L., TERRY, JOHN, and HERRICK, H. N. J. 1899. Notes on a collection of lizards from New Mexico. Bull. Sci. Lab. Denison Univ., XI, Art. VI, pp. 117-148.
Notes on *Eumeces*.

HIGLEY, W. K. 1889. Reptilia and Batrachia of Wisconsin. Trans. Wisc. Acad. Sci. Arts Letters, VII, pp. 156-176.
Lists locality records for *Eumeces septentrionalis*.

HILGENDORF, F. 1880. Bemerkungen ueber die von ihm in Japan gesammelten Amphibien nebst Beschreibung zweier neuer Schlangenarten. Sitz. Ges. Naturf. Freunde Ber., 1880, pp. 111-121.
Eumeces quinquelineatus (= *E. latiscutatus*) listed, p. 113.

HOFFMANN, C. K. 1890. Eidechsen und Wasserechsen. In H. G. Bronn's Klassen und Ordnung des Thier-Reichs. . . Vol. 6 (Abt. III, Reptilien, Vol. II), pp. 441-1399, pls. XLIX-CVII, 8 text figs.
On page 1148 is a description of *Plestiodon*, with notes on the species. *"Lanceolatus"* is listed from the Loo Choo Islands! *Eumeces* is recognized as a separate genus on pp. 1148-1149.

HOHENACKER, FR. 1831. Notice sur quelques objets d'histoire naturelle des provinces meridionales du Caucase. Bull. Soc. d'Imp. Nat. de Moscou, III, 1831, pp. 363-381.
Lacerta scincus (non Linné) mentioned on p. 365.

HOLBROOK, JOHN EDWARDS. 1838. North American Herpetology. Vol. II, 1838.
A careful description of *Scincus erythrocephalus* (p. 101), with a full plate in color (pl. XXII), is given. The specimen figured is in the Philadelphia Academy of Natural Sciences collection.

——— 1839. North American herpetology. Vol. III, 1839.
Scincus quinquelineatus is discussed and figured in color, with a dorsal and ventral view, full size (p. 39, pl. VI); also *Scincus fasciatus* (p. 45, pl. VII).

——— 1842. North American herpetology. Second Edition, II, 1842.
The following species are discussed: *Plestiodon erythrocephalus* (pp. 117-120, pl. XVI); *Scincus quinquelineatus* (pp. 121-125, pl. XVII); *Scincus fasciatus* (pp. 126-131, pl. XVIII).

HORA, SUNDER LAL. 1923. Reptilia and batrachia of the Salt Range, Punjab. Rec. Indian Mus., XXV, pp. 369-376.
Lists *Eumeces taeniolatus* (Blyth) from the Salt Range.

HOY, P. R. 1883. Catalogue of the cold-blooded vertebrates of Wisconsin I. Reptiles. Geology of Wisc., I, pp. 422-425.
Lists *Eumeces septentrionalis*.

HUGHES, EDWARD. 1885. Catalogue of the reptiles and amphibians of Franklin Co. (Ind.). Bull. Brookville Soc. Nat. Hist., I, pp. 40-45.
Reports *Eumeces fasciatus* from Brookville, Ind.

HURTER, JULIUS. 1883. Catalogue of reptiles and batrachians, collected in the state of Missouri. Privately printed price list.
Lists *Eumeces quinquelineatus* and *anthracinus*.

——— 1893. Catalogue of reptiles and batrachians found in the vicinity of St. Louis, Missouri. Trans. Acad. Sci. St. Louis, Dec. 12, 1893, VI, pp. 251-261.

——— 1911. Herpetology of Missouri. Trans. Acad. Sci. St. Louis, XX, pp. 59-274, pls. XVIII-XXIV.
Gives accounts of *Eumeces anthracinus* and *E. quinquelineatus*, with locality records. The old red-headed male from Butler Co. is doubtless *E. laticeps*.

——— 1912. Reptiles and batrachians of Laguna Beach. Ann. Rept. Laguna Marine Lab., I, 1912, p. 67.
Reports *Eumeces skiltonianus*.

HURTER, JULIUS, and STRECKER, JOHN K. 1909. Amphibians and reptiles of Arkansas. Trans. Acad. Sci. St. Louis, XVIII, 1908-1909, pp. 1-27.
Reports locality records for *Plestiodon anthracinus* in Missouri, Oklahoma and Texas, and several for *P. quinquelineatus*.

INGOLDSBY, CAPT. C. M., and PROCTOR, JOAN B. 1923. Notes on a collection of reptilia from Waziristan and the adjoining portion of the N. W. Frontier Province. Journ. Bombay Nat. Hist. Soc., XXIX, pp. 117-130.
Eumeces scutatus reported from Kaur Bridge, Ladha, and Wana, in northwest India; *E. schneiderii* from Kirghi, Jandola, Kotkai, Serwekai and Wana. Discusses variation.

JAN, G. 1857. Cenni sul Museo Civico di Milano ed Indice Sistematico dei Rettili ed Anfibi. Milan, 1857, pp. 1-61.
Lists *Plestiodon laticeps* and *quinquelineatum* from Georgia.

JERDON, T. C. 1870. Notes on Indian herpetology. Proc. Asiatic Soc. Bengal, 1870, pp. 72-73.
Reports *Pleistodon* (*Eumeces*) *scutatus* from the Alpine Punjab.

JONES. 1859. A naturalist in Bermuda. 1859.
Reports a common lizard as *Scincus*, related to *Scincus fasciatus*.

JORDAN, DAVID STARR. 1916. A manual of the vertebrates of the United States. 12th edition. 1916.
Lists various species of *Eumeces*, with key.

KESSLER, K. 1878. Puteshestive po Zakavkazskomu Krain v. 1875, g. s. zoologisheskou tselin. Trans. St. Petersb. Nat. Soc., VIII, 1878, Suppl.
Eumeces pavimentatus mentioned p. 177.

KING, WILLIS F. 1932. Arizona records from the vicinity of Mormon Lake (Arizona). Copeia, 1932, No. 2, p. 99.

KINGMAN, R. H. 1932. A comparative study of the skull in the genus *Eumeces* of the *Scincidae* (A preliminary paper). Univ. Kans. Sci. Bull., XX, pp. 273-295, pls. XXI-XXIV.
Studies in comparative anatomy of the skulls of *fasciatus, septentrionalis, laticeps, tetragrammus, chinensis, longirostris, schneiderii pavimentatus, skiltonianus* and *humilis*. Excellent figures of the skulls are given.

KIRTLAND, JARED POTTER. 1838. A catalogue of the birds, reptiles, fishes, Testacea and Crustacea in Ohio. First Ann. Rept. Ohio Geol. Surv., Columbus, 1838.
Scincus quinquelineatus mentioned p. 188.

KLAUBER, L. M. 1928. A list of the amphibians and reptiles of San Diego county, California. Bull. Zoöl. Soc. San Diego, No. 4, pp. 1-8.
Lists *Eumeces skiltonianus*.

——— 1930. A list of the amphibians and reptiles of San Diego county, California. Second edition. Bull. Zoöl. Soc. San Diego, No. 5, 1930, pp. 1-8.
Lists *Eumeces skiltonianus*.

——— 1934. Annotated list of the amphibians and reptiles of the southern border of California. Bull. Zoöl. Soc. San Diego, No. 11, Aug. 15, 1934, pp. 1-28, 8 figs.
Eumeces skiltonianus.

KLOTS, ALEXANDER BARRETT. 1930. Notes on Amphibia and Lacertilia collected at Weymouth, N. J. Copeia, No. 173, 1930, pp. 107-111.
Habits of *Eumeces fasciatus* in care of eggs.

KNOWLTON, GEORGE F., and JANES, MELVIN J. 1934. Distributional and food habits notes on Utah lizards. Copeia, 1934, No. 1, Apr. 24, pp. 10-12.
Notes on *Eumeces skiltonianus.*

KUHL, HEINRICH. 1820. Beiträge zur Zoologie und vergleichenden Anatomie. Frankfort a. M., 1830, pp. 1-213.
Scincus quinquelineatus mentioned on page 128.

KULAGIN, N. M. 1890. Kollektsia presmykaiutshihsia dostavlennaia Doktorom P. A. Burtsevym iz Ussuriskago Kraia. Bull. Zoöl. Soc. St. Petersb. Nat. Soc., LXVII, 1890, Zoöl. Sec., Vol. VI.

LACÉPÈDE. 1788. Histoire naturelle des Quadrupèdes ovipares et des serpens. Vol. I.
Le lézard à queue bleue and *Le lézard strié* are mentioned on p. 360.

LALLEMENT, C. 1876. Erpétologie de Algerie. Paris, 1876, pp. 1-47. Abridgement of Strauch's Essai.

LATASTE, F. 1881. Liste des Vertébrés recueillis par M. le Dr. André pendant l'expédition des Chotts. Arch. Miss. Sci., (3), VII, 1881, pp. 398-440.

LATREILLE, P.-A. 1808. l'Histoire naturelle des Reptiles. Vols. I-IV.
Vol. I, p. 248, contains the type description of *Lacerta tristata.* In Vol. II, p. 74, is a description of *Scincus quinquelineatus.*

LINNÉ, CAROLUS VON. 1758. Systema naturae. Editio Decima, Reformata. Tom. I, 1758.
The type description of *Lacerta fasciata* appears, with the type locality Carolina. Based on an illustration in Catesby.

——— 1766. Systema naturae. 12th Ed.
Lacerta fasciata and *Lacerta quinquelineata* appear. The description of the latter is the type, and the type locality is given as Carolina.

LINSDALE, JEAN M. 1927. Amphibians and reptiles of Doniphan county, Kansas. Copeia, No. 164, 1927, pp. 75-81.
Notes on *Eumeces fasciatus.*

LINSLEY, J. H. 1843. A catalogue of the reptiles of Connecticut, arranged according to their natural families. Amer. Journ. Sci. Arts, (1), 46, pp. 37-51.
Records data on the occurrence of *Eumeces fasciatus.*

LÖDING, H. P. 1922. A preliminary catalogue of Alabama amphibians and reptiles. Mus. Paper No. 5, Alabama Mus. Nat. Hist., pp. 1-59.
Reports the species *Plestiodon pluvialis* (Cope) from the type locality, Mobile, Alabama. *Eumeces fasciatus* is also listed.

LOENNBERG, EINAR. 1894. Notes on reptiles and batrachians collected in Florida in 1892 and 1893. Proc. U. S. Nat. Mus., 17, pp. 317-339.
Notes on *Eumeces fasciatus,* probably mixed with other species.

LORTET, L. 1883. Poissons et Reptiles du Lac de Tibériade et de quelques autres parties de la Syrie. Arch. Mus. Hist. Nat. Lyon, III, 1883 (reptiles and amphibians, pp. 183-189).

LOVERIDGE, ARTHUR. 1930. On some skinks of the genus Eumeces from North America. Copeia, 1930, No. 173, Jan. 16, p. 112.
Eumeces egregius is discussed, and *E. lagunensis* is referred to the synonymy of *E. skiltonianus.*

MACCOY, CLINTON V. 1931. Key for the identification of New England amphibia and reptiles. Bull. Boston Soc. Nat. Hist., No. 59, 1931, pp. 25-33.
Lists *Eumeces fasciatus* in key.

MCLAIN, ROBERT BAIRD. 1899. Notes on a collection of reptiles from the western coast of the United States. Cont. to N. Amer. Herp. Privately printed, Wheeling, W. Va., Feb. 1899. pp. 1-13.
Discusses *Eumeces skiltonianus* and presumes that *E. lagunensis* is a synonym of the former species (p. 10).

——— 1899*a*. Notes on a collection of reptiles, made by C. J. Pierson at Fort Smith, Ark., with remarks on other eastern reptiles. Cont. to N. Amer. Herp. Privately printed, 1899, pp. 1-5.
Numerous locality records from various states are given for *Eumeces fasciatus*.

MARTENS, EDUARD VON. 1876. Japanische Reptilien. Verzeichniss der gesammelten oder beobachteten Wirbelthiere. Preuss. Exped. Ostasien, Zool., I, 1876, pp. 362-410.
Eumeces (*Plestiodon*) *quinquelineatus* var. *japonicus* reported from Nagasaki, p. 376.

MEARNS, EDGAR A. 1898. A study of the vertebrate fauna of the Hudson highlands with observations on the Mollusca, Crustacea, Lepidoptera and the flora of the region. Bull. Amer. Mus. Nat. Hist., X, 1898, pp. 103-352 (Reptiles pp. 326-330).
Notes on the occurrence of *Eumeces fasciatus*.

MELL, R. 1922. Beiträge zur Fauna Sinica I. Die Vertebraten Südchinas: Feldlisten und Feldnoten der Säuger, Vögel, Reptilien, Batrachier. Arch. Naturg., 88, Jahr 1922, Abt. a, 10 Heft, pp. 1-146 (Rept. and Batr. pp. 100-134).
Gives localities for *Eumeces chinensis, elegans* and *quadrilineatus*.

——— 1929. Beiträge zur Fauna Sinica IV. Grundzüge einer Ökologie der chinesischen Reptilien und einer herpetologischen Tiergeographie Chinas. Berlin und Leipzig, 1929, pp. 1-282, figs. 1-34.
Various species of *Eumeces* mentioned.

——— 1931. The distribution of Chinese reptiles in relation to zoögeographical boundaries. Lingnan Sci. Journ., 8, 1931, pp. 221-258.
Lists *Eumeces pekinensis* as endemic in the North China Province, and *xanthi* and *tungarus* (sic) in the West China Province.

MERREM, BLASIUS. 1820. Tentamen Systematis Amphibiorum. Marburg, 1820.
Type description given of *Scincus cepedii*, and *Scincus quinquelineatus* is mentioned on page 72.

MERTENS, ROBERT. 1920. Uber die geographischen Formen von *Eumeces schneiderii* Daudin. Senckenbergiana, (2), 1920, pp. 176-179.
Recognizes three subspecies of *Eumeces schneiderii* (Daudin): *algericnsis, schneiderii* and *princeps*.

——— 1922. Verzeichniss der Typen in der herpetologischen Sammlung des Senckenbergischen Museums. Senckenbergiana, IV, Heft 6, 1922, pp. 162-183.
Lists the type specimen of *Eumeces pavimentatus* var. *syriaca*. Type locality, Sarona bei Jaffa, Syria, No. 6383.

——— 1924. Amphibien und Reptilien aus dem nördlichen Mesopotamien. Abh. Ber. Mus. Natur-Heimatk. Naturw. Ver. Magdeburg, III, Heft 4, 1924, pp. 249-390, 1 pl.
Reports *Eumeces schneiderii princeps* (Eichwald) from Mardin., with descriptions of the specimens.

——— 1924*a*. Herpetologische Mitteilungen V. Zweiter Beitrag zur Kenntniss der geographischen Formen von *Eumeces schneiderii* Daudin. Senckenbergiana, VI, Heft 5-6, 1924, pp. 182-184.
Recognizes three subspecific forms of *E. schneiderii: Eumeces schneiderii pavimentatus* Geoffroy, *E. s. cyprius* Cuvier, *E. s. schneiderii* Daudin and *E. s. algericusis* Peters.

——— 1926. Ueber einige Eidechsen in gefangenschaft. Blätt. für Aquar.-Terr.- kunde, Stuttgart, XXXVII, 1926, pp. 1-11 (sep. pag.), 4 figs.
Eumeces latiscutatus discussed, pp. 10-11.

——— 1934. Die Insel Reptilien, ihre Ausbreitung, Variation und Artbildung. Zoologica, 32, Lieferung 6, Heft 84, 1934, pp. 1-209, pls. 1-6, text figs. 1-9.
Includes discussion of various island forms of *Eumeces*.

MEYER, FRED, A. A. 1795. Synopsis Reptilium novam ipsorum sistens generum methodum, nec non gottingensum hujus ordinis animalium enumerationem. Göttingae 1795, 8vo (not seen).
Lacerta quinquelineata listed.

MIKHAILOVSKI, M. 1904. [Herpetological fauna of the Transcaspian region. Material collected near Askhabad in 1903 by I. V. Vasiliev]. Yearbook Zoöl. Mus. Imp. Acad. Sci., St. Petersb., IX, 1904, pp. 39-44.
Eumeces scutatus reported from Transcaspia, Durun near Askhabad, and Bakharden (p. 41).

MOCQUARD, M. F. 1907. Les Reptiles de l'Indo-Chine. La Revue Coloniale, July 1906, pp. 1-59.
Lists *Eumeces quadrilineatus* but gives no specific locality.

MORSE, MAX. 1904. Batrachians and reptiles of Ohio. Proc. Ohio State Acad. Sci., IV, Pt. 3, Special Paper No. 9, 1904, pp. 92-144.
Eumeces anthracinus listed as probably occurring in the state. Records given for *E. quinquelineatus*.

MOSAUER, WALTER. 1932. The amphibians and reptiles of the Guadalupe Mountains of New Mexico and Texas. Occ. Papers Mus. Zoöl. Univ. Mich., No. 246, June 9, 1932, pp. 1-18, pl. 1.
Eumeces obsoletus, E. humilis and *E. multivirigatus* are reported. The record for *humilis* is the first for the United States.

MÜLLER, BARON I. W. 1865. Reisen in den Vereinigten Staaten, Canada und Mexico. Leipzig, 1865. Three Vols. Vol. III, pp. 1-643. (Part III, Die Wirbelthiere Mexicos, pp. 535-643).
Three Mexican species of *Eumeces* listed.

MÜLLER, F. 1880. Katalog der in Museum und Universitätskabinet zu Basel aufgestellten Amphibien und Reptilien nebst Anmerkungen. Verh. Naturf. Ges. Basel, VI, 1880, pp. 559-709.

MURRAY, JAMES A. 1884. The vertebrate zoölogy of Sind. A systematic account, with descriptions of all the known species of mammals, birds and reptiles inhabiting the province; observations on their habits, etc. London and Bombay, 1884. Reptilia and Batrachia, pp. 338-401, 5 pls.
Eumeces taeniolatus (Blyth) described, and reported from Sind, Punjab and Kashmir (p. 356).

MYERS, GEORGE S. 1924. Amphibians and reptiles from Wilmington, N. C. Copeia, No. 131, 1924, pp. 59-62.
Eumeces fasciatus listed.

——— 1925. Synopsis for identification of amphibians and reptiles of Indiana. Proc. Ind. Acad. Sci., 35, 1925, pp. 277-294.

——— 1930. Amphibians and reptiles observed in the Palisades Interstate Park, New York and New Jersey. Copeia, No. 173, Jan. 16, 1930, pp. 99-103.

NECKER, WALTER L. 1934. Contribution to the herpetology of the Smoky Mountains of Tennessee. Bull. Chicago Acad. Sci., 5, No. 1, Jan. 26, 1934, pp. 1-4.
Eumeces fasciatus, mentioned.

NELSON, EDWARD W. 1921. Natural resources of Lower California. Mem. Acad. Nat. Sci., XVI, No. 1, pp. 1-171.
Lists *Plestiodon skiltonianus lagunensis* (pp. 114-115).

NELSON, JULIUS. 1890. Descriptive catalogue of the vertebrates of New Jersey. Geol. Surv. New Jersey, II, Pt. 2, 1890, pp. 491-824.
Comments on *Eumeces fasciatus*.

NETTING, GRAHAM. 1926. The occurrence of lizards in Allegheny county (Pa.). Pittsburg Naturalist, I, Jan., 1926, p. 7.
Notes on *Eumeces fasciatus*.

——— 1930. The occurrence of lizards in Pennsylvania. Ann. Carnegie Mus., XIX, No. 3, 1930, pp. 169-174.
Eumeces anthracinus and *E. fasciatus* are discussed and locality records given.

NIKOLSKI, A. M. 1886. Material k poznaniu fauny pozvonochnye S. V. Persii i Zakaspiskoi oblasti. [Contribution to the knowledge of the fauna of vertebrate animals of northeastern Persia and Transcaspia. Russian Text.] Trans. Imp. Soc. Nat. St. Petersb., XVII, 1886, pp. 379-407. (Reptiles and batrachians, pp. 403-406).
Euprepis principes mentioned on p. 406.

——— 1899. Reptiles, Amphibies et Poissons recueillis pendent le voyage de Mr. N. A. Zaroudny en 1898 dans la Perse. [Russian text]. Annuaire du Musée St. Petersb., IV, 1899, pp. 375-418, pl. XX.
Contains the type description of *Eumeces zarudnyi,* with the type locality Seistan and Kirman in East Persia (pp. 399-400, Pl. XX, fig. 4). *Eumeces schneiderii* is listed from Gerri Schotur in Chascht-Adno.

——— 1899*b*. Herpetologia turanica A. Fedtschenko Reise in Turkestan. Zool. Moscow, 1899, 4 to, pp. 1-84, 9 pls.
Eumeces scutatus (p. 42) and *Eumeces schneiderii* (p. 44) are discussed.

——— 1905. Herpetologia Rossica. Mémoirs de l'académie Impériale des Sciences de St.-Pétersbourg, (VIII), Vol. XVII, No. 1, 1905, pp. 1-517, pls. 1 and 2.
Lists *Eumeces scutatus* (pp. 184-185) and *E. schneiderii* (pp. 185-187) from Transcaucasia, Transcaspia and Turkestan.

——— 1911. Contributions a l'herpetologie de la Boukhara oriental. Ann. Mus. Zoöl. Ac. Sci. St. Petersb., XVI, 1911, pp. 271-284.
Eumeces schneiderii noted.

——— 1913. Herpetologia Caucasica. Tiflis, 1913, pp. 1-272, pls. 1-2.
Eumeces schneiderii listed (p. 110-111) from Transcaspia.

——— 1915. Faune de la Russié et des pays limitrophes fondee principalement sur les collections du Musee Zoologique de l'Académie Impériale. 3 vols. Vol. 1. Chelonia and Sauria, pp. 1-533, with numerous figures.
Discusses *Eumeces scutatus*, pp. 506-508, figs. 63, 63a, 64; *E. latiscutatus*, pp. 508-510; *E. schneiderii*, pp. 511-513, figs. 65-68; and gives locality records. Specimens of a skink from Imperator, Olga and St. Vladimir bays on the Visuri coast of Siberia are doubtfully referred to *E. latiscutatus*.

NOBLE, G. K., and BRADLEY, H. T. 1933. The mating behavior of lizards: its bearing on the theory of sexual selection. Ann. New York Acad. Sci., XXXV, 1933, pp. 25-100.

NOBLE, G. K., and MASON, E. R. 1933. Experiments on the brooding habits of the lizards *Eumeces and Ophisaurus*. Amer. Mus. Nov., No. 619, May 11, 1933, pp. 1-29.
Brooding habits of *Eumeces fasciatus* and *E. laticeps* discussed (pp. 1-19.)

NOBLE, G. K., and TEALE, H. K. 1930. The courtship of some iguanid and teiid lizards. Copeia, 1930, No. 2, June, pp. 54-56.
Notes on the courtship of *Eumeces fasciatus*.

NUTTING, C. C. Report of committee on state fauna of Iowa.
Eumeces septentrionalis listed.

OKADA, S. 1891. Catalogue of vertebrated animals of Japan. Tokyo, 1891, pp. 1-125.
Eumeces marginatus (part.) reported (those from Tokyo, Hakona, Nikko, Awiji and Suwa are to be referred to *Eumeces latiscutatus*) (p. 70).

——— 1933. On the parallelism between the distribution of lizards and of anurans in the Japanese Empire. Science Reports Tokyo Univ. Lit. and Sci., Sec. B, Vol. I, No. 13, Aug. 15, 1933, pp. 145-153, 1 map.
Shows distribution of the genus *Eumeces*

——— 1933*a*. The herpetological fauna in the vicinity of Nikkô, Japan. Science Reports Tokyo Univ. Lit. and Sci., Sec. B, Vol. I, No. 15, Nov. 15, 1933, pp. 159-173, text figs. 1-10.
Eumeces latiscutatus mentioned, p. 172.

OLIVIER, ERNST. 1894. Herpétolgia algérienne. Mém. Soc. Zool. de France, 1894, pp. 1-36.
Eumeces algeriensis included.

OPPENHEIMER, C., and PINCUSSEU, L. 1930. Tabulae biologicae. Junk, VI, Suppl. II, 1930.
Collected data presented (p. 673) on several species of *Eumeces* (compiled from other writers).

ORTENBURGER, A. I. 1926. Reptiles and amphibians collected in the Wichita Mts., Comanche county, Oklahoma. Copeia, No. 155, 1926, pp. 137-138.
Eumeces fasciatus, obsoletus and *anthracinus* listed.

——— 1926*a*. A report of the amphibians and reptiles of Oklahoma. Proc. Okla. Acad. Sci., VI, Pt. I, 1926, pp. 89-100.
Eumeces obsoletus reported from Alfalfa, Comanche, Kay and Tulsa counties; *E. anthracinus* from Comanche, Pushmataha and Tulsa counties; *E. pachyurus* from Caddo and Cleveland counties; *E. brevilineatus* from Caddo county; and *E. fasciatus* from numerous localities.

——— 1927. A list of the reptiles and amphibians from the Oklahoma panhandle. Copeia, No. 163, April-June, 1927, pp. 46-48.
Eumeces obsoletus listed from Cimarron county.

——— 1929. Reptiles and amphibians from southeastern Oklahoma and southwestern Arkansas. Copeia, No. 170, 1929. pp. 8-12.
Records of *Eumeces fasciatus.*

——— 1929*a*. Reptiles and amphibians from northeastern Oklahoma. Copeia, No. 170, 1929, pp. 26-28.
Locality records for *Eumeces fasciatus.*

——— 1930. Reptiles and amphibians from Pawnee county, Oklahoma. Copeia, No. 173, 1930, pp. 94-95.
Eumeces fasciatus and *guttulatus* listed.

——— 1930*a*. A key to the lizards and snakes of Oklahoma. Publ. Okla. Biol. Surv., II, No. 4, 1930, pp. 209-239.
Eumeces obsoletus and *fasciatus* listed, with figs. 41 and 43 of *fasciatus,* and fig. 42 of *obsoletus.*

ORTENBURGER, A. I., and FREEMAN, BERYL. 1930. Notes on some reptiles and amphibians from western Oklahoma. Publ. Univ. Okla., II, Biol. Surv. No. 4, 1930, pp. 175-188.
Eumeces obsoletus and *guttulatus* reported.

OVER, WILLIAM H. 1923. Amphibians and reptiles of South Dakota. South Dakota Geol. and Nat. Hist. Surv. Bull., No. 12 (Bull. Univ. S. Dakota, Ser. XXIII, 1923, No. 10), pp. 1-34, pls. 1-18.
E. septentrionalis listed with the statement that the species cannot regenerate a new tail! *E. fasciatus* reported from near Vermillion, S. D.

PALLARY, P. 1928. Sur trois petits vertebrates du Maroc: le *Xerus getulus, l'Eumeces algeriensis* et le *Lacerta perspicillata.* Bull. Soc. Hist. Nat. Algiers, XIX, 1928, p. 100.
Discusses *Eumeces algeriensis.*

PATCH, CLYDE L. A rattlesnake, melano garter snakes, and other reptiles from Point Pelee, Ontario. Canadian Field Naturalist, XXXIII, pp. 60-61.
Lists *Plestiodon fasciatus* as common.

——— 1934. *Eumeces* in Canada. Copeia, 1934, No. 1, Apr. 24, pp. 50-51.
Records *E. fasciatus, septentrionalis* and *skiltonianus.*

PAVLOV, P. 1932. Listes des Sauriens et Serpens des collections do Musée Hoang ho Pai ho de Tien Tsin. Publ. Mus. Hoang ho Pai ho, No. 12, pp. 1-27.

Lists *E. latiscutatus, E. chinensis* and *E. pekinensis* from various localities. The record of the first species from Koankia ho Kansou may be regarded as doubtful.

PELLEGRIN, DR. JAQUES. 1912. Reptiles Batraciens et Poissons du Maroc. (Récollés par le Dr. H. Millet.) Bull. Soc. Zoöl. France, XXXVII, 1912, pp. 255-264.

Eumeces algeriensis given on pages 256 and 263, from Fedhella, Azemmour, and Mogador, collected by Du Gast.

PERACCA, M. G. 1894. Viaggio del Dr. E. Festa in Palestina nel Libano e regione vicine. Rettili ed anfibi. Boll. Mus. Zoöl. Anat. Comp. Univ. Torino, IX, 1894, pp. 1-20.

Reports *Eumeces schneiderii* (Daudin) from Es-Salt and Dscherasch.

PETERS, W. 1864. Uber die Eidechsen-familie der Scincoiden, inbesondere über die Schneider'schen, Wiegmann'schen und neue Arten des zoologischen Museums zu Berlin. Monatsb. Königl. Preus. Akad. Wiss. Berlin, Jan. 14, 1864, pp. 44-58.

Contains the type descriptions of *Eumeces schneiderii algeriensis* and *Eumeces quinquelineatus japonicus.* Peters points out that the name *Plestiodon* is not tenable for these species and reëstablishes the name *Eumeces* Wiegmann. *E. lynxe* is correctly placed in the genus *Eumeces.*

PETIVER, JACOB. 1695-1705. Musei petiveriani centuriae X, rariora continentes. London, 1695-1705, 8 vo.

Gives (vol. 1, pl. 1, figs. 1-2) *Lacerta marianus minor cauda caerulea* (= *Lacerta fasciata* Linnaeus).

——— 1702. Gazophylacii naturae et artis decades. London, 1702, folio, pls. 1-100.

S. americanus? pl. 69, fig. 13.

PIATT, JEAN. 1931. Herpetological report of Morgan county, Indiana. Proc. Ind. Acad. Sci., 40, 1930, pp. 361-368.

Lists *Plestiodon fasciatus.*

PICKENS, A. L. 1927. Reptiles of upper South Carolina. Copeia, No. 165, 1927, pp. 110-113.

Records *Eumeces fasciatus* from Anderson, Abbeyville and Columbia.

POPE, CLIFFORD H. 1929. Notes on the reptiles from Fukien and other Chinese Provinces. Bull. Amer. Mus. Nat. Hist., LVIII, 1929, pp. 335-487.

Treats *E. elegans* and *E. chinensis,* from large series collected by himself, with excellent data.

POPE, T. E. B. 1928. Wisconsin herpetological notes. Year-book Public Museum, Milwaukee, VIII, 1928, pp. 177-184.

Eumeces septentrionalis listed from Chippewa Falls, Chippewa county.

——— 1930. Wisconsin herpetological notes. Trans. Wisc. Acad. Sci. Arts Letters, XXV, 1930, pp. 273-284.

Same data on *Eumeces* as in preceding paper (p. 276).

——— 1931. Wisconsin herpetological notes. Trans. Wisc. Acad. Sci. Arts Letters, XXVI, May 1931, pp. 321-329.

POPE, T. E. B., and DICKINSON, W. E. 1928. The amphibians and reptiles of Wisconsin. Bull. Publ. Mus. Milwaukee, VIII, 1928, No. 1, pp. 1-138, pls. 1-21, text figs. 1-28.

Discusses the distribution of *Eumeces septentrionalis* and *fasciatus* within the state of Wisconsin.

PRATT, HENRY SHERRING. 1923. Vertebrate animals of the United States. Philadelphia, 1923, pp. 1-420.

Keys for various species of *Eumeces* are given.

REED, HUGH D., and WRIGHT, ALBERT H. 1909. The vertebrates of Cayuga Lake basin, N. Y. Proc. Amer. Philos. Soc., XLVIII, 1909, pp. 370-459.

Lists *Leiolopisma laterale* Say from a specimen which proves to be *Eumeces anthracinus.* States: One specimen, No. 3550, taken at Caroline, Apr. 23, 1892, by W. J. Terry and L. A. Fuertes.

RHODES, SAMUEL N. 1895. Contributions to the zoölogy of Tennessee, No. 1. Reptiles and amphibians. Proc. Acad. Nat. Sci. Phila., 1895, pp. 376-408.
Lists *Eumeces fasciatus.*

RICE, E. L. 1920. The development of the skull in the skink *Eumeces quinquelineatus.* Journ. Morph., XXXIV, 1920, pp. 119-216, 12 pls.
Embryo and skull development treated.

RODDY, HARRY JUSTIN. 1928. Reptiles of Lancaster county and the state of Pennsylvania. Sci. Press, Lancaster, Pa., 1928, pp. 1-53.
Notes on *Eumeces anthracinus,* and *E. fasciatus.*

RUTHVEN, A. G. 1910. Contributions to the herpetology of Iowa. Proc. Acad. Sci. Iowa, XVII, 1910, pp. 198-209, fig. 7.
An account of *Eumeces septentrionalis,* with figure, appears.

——— 1911. The reptiles of Michigan. Mich. Geol. Biol. Surv. Publ. 10, Biol. Ser. 3, 1911, pp. 79-81.
Records *E. fasciatus* in Michigan.

——— 1919. Contribution to the herpetology of Iowa III. Occ. Papers Mus. Zoöl. Univ. Mich., No. 66, 1919, pp. 1-3. *Plestiodon septentrionalis* is listed from Lake Okoboji, Dickinson county.

RUTHVEN, ALEXANDER G., and GAIGE, HELEN THOMPSON. 1915. The reptiles and amphibians collected in northwestern Nevada by the Walker-Newcomb expedition of the University of Michigan. Occ. Papers Mus. Zoöl. Univ. Mich., No. 8, 1915, pp. 1-34, pls. 1-5.
Reports, with discussion of variation, five specimens of *Eumeces skiltonianus* from Carlin Peaks, Nevada.

——— 1933. A new skink from Mexico. Occ. Papers Mus. Zoöl. Univ. Mich., No. 260, April 3, 1933, pp. 1-3.
The type description of *Eumeces dicei* appears. The type locality is Marmolejo, Tamaulipas, Mexico.

RUTHVEN, ALEXANDER G., THOMPSON, CRYSTAL, and GAIGE, HELEN THOMPSON. 1928. The herpetology of Michigan. Mich. Handbook Series, No. 3, pp. i-x, 1-230, frontis., 19 pls., 52 text figs.
An excellent account appears of *Eumeces fasciatus,* with a distributional map of the species within the state.

SACHS, W. B. 1918. Blätt. fur Aquar. und Terr. Kunde, XXIX, 1918, pp. 281-282.
Eumeces schneiderii discussed.

——— 1919. Blätt. fur Aquar. und Terr. kunde, XXX, 1919, pp. 298-299.
Eumeces schneiderii discussed.

SAGER, ABRAM. 1839. On American amphibia. Silliman's Journ., XXXVI, pp. 320-324.
Under the name *Scincus lateralis* var. is described *Eumeces fasciatus,* with a poor figure. It is stated to be "found, though rarely, in Detroit."

SAY, THOMAS. 1818. Notes on Professor Green's paper on the amphibia, published in the September number of this journal. Journ. Acad. Nat. Sci. Phila., I, Pt. 2, Oct., 1818, pp. 405-407.
Comments on the identification of *Lacerta 5-lineata.* Believes it to be a synonym of *Lacerta fasciata.*

——— 1823. *In* Long's Account of an expedition from Pittsburgh to the Rocky Mountains, performed in the years 1819 and '20. H. C. Carey and I. Lea, Philadelphia, 1823, Vol. 2, pp. i-xcviii, 6-442.

SCHMIDT, F. G. W. 1926. List of the amphibians and reptiles of Worden township, Clark Co., Wisconsin. Copeia, No. 154, May 20, 1926, pp. 131-132.
Eumeces septentrionalis listed from Chippewa Falls.

SCHMIDT, KARL. 1916. Notes on the herpetology of North Carolina. Journ. Elisha Mitchell Sci. Soc., XXXII, 1916, pp. 33-37.
Lists *Plestiodon quinquelineatus.*

——— 1919. Contributions to the herpetology of the Belgian Congo based on the collection of the American Museum Congo expedition, 1909-1915. Part I. Turtles, crocodiles, lizards and chamaeleons. Bull. Amer. Mus. Nat. Hist., 39, Art. 2, 1919, pp. 385-602.
Notes on distribution and derivatives of *Plestiodon*.

——— 1922. The amphibians and reptiles of Lower California and the neighboring islands. Bull. Amer. Mus. Nat. Hist., XLVI, 1922, pp. 607-707.
Lists *Eumeces skiltonianus* from Todos Santos Is. Regards *E. lagunensis* a synonym.

——— 1924. A list of the amphibians and reptiles collected near Charleston, S. C. Copeia, No. 132, 1924, pp. 67-69.
Lists *Plestiodon fasciatus*.

——— 1927. Notes on Chinese reptiles. Bull. Amer. Mus. Nat. Hist., LIV, 1927, pp. 467-551, pls. XXVIII-XXX, text figs. 1-22.
Treats of four species of Chinese *Eumeces*. Reëstablishes *E. pulcher*, as a good species. *Eumeces quadrilineatus* is figured (fig. 12).

SCHNEIDER, JOANN GOTTLOB. 1799-1801. Historiae Amphibiorum naturalis et literariae. Fasc. Primus, 1799; Fasc. secundus, 1801; Jena.
The type description of *Scincus laticeps* appears (Fasc. secundus, p. 189), and *Scincus quinquelineatus* is mentioned (p. 201).

SEVERTZOFF, N. A. 1873. Vertikalnoe i gorizontalnoe Rasprostranenie Turkestanskih Jevotnie. [Fauna of Turkestan] Bull. Soc. Imp. Nat. Moscow, 1873, p. 72.

SHAW, G. 1802. General Zoölogy. Amphibia. III, 1802, Pt. 1.
Brief descriptions of *Lacerta quinquelineata* and *fasciata* appear. The former is said to have been "described by Doctor Garden," who sent specimens to Linné (p. 241).

SKILTON, AVERY J. 1849. Description of two reptiles from Oregon. Amer. Journ. Sci. Arts (Silliman's Journ.), (2), VII, May 1849, p. 202.
Mentions that "several skinks resembling *S. quinquelineatus* were caught by the Indians for the Missionaries with hair snares." These specimens were sent by Rev. George Gary (or Geary) to the Smithsonian Institution and became the types of *P. skiltonianus*.

SMITH, EUGENE. 1899. The turtles and lizards found in the vicinity of New York. Proc. Linn. Soc. New York, 1898-1899, No. 11, pp. 11-32.
Notes on *Eumeces fasciatus*.

SMITH, HOBART M., and LEONARD, ARTHUR B. 1934. Distributional records of reptiles and amphibians in Oklahoma. Amer. Midl. Nat., XV, No. 2, 1934, pp. 190-196.
Lists *Eumeces fasciatus, obsoletus* and *septentrionalis*.

SMITH, MALCOLM. 1923. On a collection of reptiles and batrachians from the island of Hainan. Journ. Nat. Hist. Soc. Siam. VI, 1923, pp. 195-212.

——— 1929. Remarks on three rare reptiles from the Indo-Chinese region. Journ. Siam Soc. Nat. Hist. Suppl., VIII, 1929, pp. 49-50.
Reports *Eumeces quadrilineatus* from Muak Lek near Korat.

SMITH, W. H. 1879. Catalogue of the reptilia and amphibia of Michigan. Supplement to Sci. News, I, 1879, pp. 1-6.
Eumeces fasciatus listed (pp. 3, 4, 6).

——— 1882. Report on the reptiles and amphibians of Ohio. Rept. Geol. Surv. Ohio, IV, 1882, Pt. 1, pp. 629-734.
Data on *Eumeces quinquelineatus*.

SOMES, M. P. 1911. Notes on some Iowa reptiles. Proc. Acad. Sci. Iowa, XVIII, 1911, pp. 149-154.
Lists *E. septentrionalis* and *E. fasciatus*.

STANLEY, A. 1914. The collection of Chinese reptiles in the Shanghai Museum. Journ. N. China Asiat. Soc., XLV, 1914, pp. 21-31.
Lists *Eumeces elegans*.

Stejneger, Leonhard. 1893. Annotated list of the reptiles and batrachians collected by the Death Valley expedition in 1891, with descriptions of new species. The Death Valley expedition Part II. North Amer. Fauna, No. 7, 1893, pp. 159-228.

Gives an account of *Eumeces skiltonianus,* with locality records.

——— 1898. On a collection of batrachians and reptiles from Formosa and adjacent islands. Journ. Sci. Coll. Imp. Univ. Tokyo, XII, 1898, pp. 215-225.

Reports *Eumeces elegans* (p. 220) from Taipa, Formosa, and from the Pescadores Islands, and *E. chinensis* from Taipa.

——— 1901. Diagnoses of eight new batrachians and reptiles from the Riu Kiu Archipelago, Japan. Proc. Biol. Soc. Wash., XIV, 1901, pp. 189-191.

Contains the type description of *Eumeces kishinouyei* from islands of the Yayeyama group, Riu Kiu Archipelago.

——— 1907. Herpetology of Japan and adjacent territory. Bull. U. S. Nat. Mus., LVIII, 1907, pp. i-xx, 1-577, pls. I-XXXV, figs. 1-238.

Contains careful descriptions and figures of Japanese and Chinese forms.

——— 1924. A new Chinese lizard of the genus *Eumeces.* Journ. Wash. Acad. Sci., XIV, Oct. 4, 1924, pp. 383-384.

The species *Eumeces tunganus* is described from Luting Kiao, western Szechwan. The types were collected by Rev. D. C. Graham.

——— 1924*a*. Herpetological novelties from China. Occ. Papers Boston Soc. Nat. Hist., V, July 21, 1924, pp. 119-121.

Contains the type description of *Eumeces pekinensis* (= *Eumeces xanthi* Günther). The type locality is Hsin-lung-shan district, Imperial Hunting Grounds, 65 miles northeast of Peking, Chili Province, China.

——— 1925. Chinese amphibians and reptiles in the United States National Museum. Proc. U. S. Nat. Mus., LXVI, 1925, pp. 1-115, 4 text figs.

Treats four species of Chinese *Eumeces,* with a figure of *E. pekinensis.*

Stejneger, Leonhard, and Barbour, Thomas. 1917. A check list of North American amphibians and reptiles. Cambridge, Harvard Univ. Press, 1917, pp. i-iv, 1-125.

Under the name *Plestiodon,* 13 species are recognized.

——— 1923. Check list of North American amphibians and reptiles. Cambridge, Harvard Univ. Press, 1923, pp. i-iv, 1-171.

Fourteen species of *Eumeces* are listed. *Eumeces lagunensis* is the only species added over those listed in the 1917 edition. The generic name *Eumeces* replaces *Plestiodon.*

——— 1933. Check list of North American amphibians and reptiles. Cambridge, Harvard Univ. Press, 1933, pp. i-xiv, 1-185.

In this edition *Eumeces callicephalus* and *E. humilis* are added to the list recognized in the United States, while *guttulatus* is made a synonym of *obsoletus* and *E. lagunensis* is made a synonym of *skiltonianus,* leaving a total of 14 species recognized.

Stephen, Frank. 1921. An annotated list of the amphibians and reptiles of San Diego county, California. Trans. San Diego Soc. Nat. Hist., III, 1921, No. 4, pp. 57-69.

Lists *Eumeces skiltonianus* (p. 63).

Stoliczka, F. 1872. Notes on reptiles collected by Surgeon F. Day in Sind. Proc. Asiatic Soc. Bengal, XLI, 1872, p. 88.

Lists *Eumeces taeniolatus* from "right bank of Indus river between Karachi and Sakkar."

——— 1872*a*. Notes on the reptilian and amphibian fauna of Kachh. Proc. Asiatic Soc. Bengal, XLI, 1872, pp. 75-76.

Eumeces taeniolatus (Blyth) described from specimens collected at Urira, northwestern Kachh.

——— 1872*b*. Notes on various new or little known Indian lizards. Journ. Asiatic Soc. Bengal, XLI, 1872, pp. 86-135, pls. 2-5.

Eumeces discussed.

STONE, WITMER. 1903. A collection of reptiles and batrachians from Arkansas, Indian Territory and western Texas. Proc. Acad. Nat. Sci. Phila., 1903, pp. 538-542.

——— 1906. Notes on the reptiles and batrachians of Pennsylvania, New Jersey and Delaware. Amer. Nat., XL, 1906, pp. 159-170.
Notes several locality records for *Eumeces fasciatus*.

——— 1911. On some collections of reptiles and batrachians from the western United States. Proc. Acad. Nat. Sci. Phila., 1911, pp. 222-232.
Eumeces obsoletus listed from Carr Cañon, Huachuca Mts., Arizona.

STONE, WITMER, and REHN, JAMES A. G. 1903. On the terrestrial vertebrates of portions of southern New Mexico and western Texas. Proc. Acad. Nat. Sci. Phila., 1903, pp. 16-34.
Eumeces obsoletus listed from Pecos, Texas.

STORER, D. H. 1840. A report on the reptiles of Massachusetts. Boston Journ. Nat. Hist., III, 1840, pp. 205-253, pl. I (sep., pp. 1-64).
Gives a good description of *Eumeces quinquelineatus* (sep. p. 19).

STRAUCH, A. 1862. Essai d'une Erpetologie de l'Algerie. Mem. Acad. Imp. Sci. St. Petersb., (7), IV, No. 7, 1862, pp. 1-86.
Lists *Plestiodon cyprium* (Aldrov.) from Bône, St. Cloud, Le-Sig and Arzew.

STRECKER, JOHN K. 1902. A preliminary report on the reptiles and batrachians of McLennan county. Trans. Texas Acad. Sci., IV, 1901, Pt. 2, No. 5, pp. 1-7.
Records *Eumeces quinquelineatus*.

——— 1908. The reptiles and batrachians of Victoria and Refugio counties, Texas. Proc. Biol. Soc. Wash., XXI, 1908, pp. 47-52.
Lists species of *Eumeces: E. quinquelineatus* from Victoria county, and this same species with *E. tetragrammus* from Refugio county.

——— 1908*a*. The reptiles and batrachians of McLennan county, Texas. Proc. Biol. Soc. Wash. XXI, Mar. 21, 1908, pp. 69-84.
Eumeces obsoletus reported from McGregor, Texas, and *E. quinquelineatus* from Waco.

——— 1908*b*. Notes on the habits of two Arkansas salamanders, and a list of the batrachians and reptiles collected at Hot Springs. Proc. Biol. Soc. Wash., XXI, 1908, pp. 85-90.
Eumeces quinquelineatus listed.

——— 1908*c*. Notes on the breeding habits of Phrynosoma cornutum and other Texas lizards. Proc. Biol. Soc. Wash., XXI, July 27, 1908, pp. 165-170.
Notes on *Eumeces brevilineatus* and *E. fasciatus*.

——— 1909. Contributions to Texas herpetology. Notes on the herpetology of Burnett county, Texas. Baylor Univ. Bull., XII, No. 1, Jan., 1909, pp. 1-9.
A good account of *Eumeces brevilineatus*, with records for *obsoletus* and *tetragrammus*.

——— 1909*a*. Contributions to Texas herpetology. Reptiles and amphibians collected in Brewster county, Texas. Baylor Univ. Bull., XII, No. 1, Jan., 1909, pp. 11-16.
Reports *Eumeces brevilineatus* and *E. tetragrammus*. This last specimen proves to be *E. septentrionalis obtusirostris* Bocourt. Reports seeing *obsoletus*.

——— 1910. Notes on the fauna of northwestern Texas. Notes on the fauna of a portion of the canyon region of northwestern Texas. Baylor Univ. Bull., XIII, Nos. 4 & 5, 1910, pp. 1-31.
Eumeces guttulatus and *obsoletus* reported.

——— 1910*a*. Description of a new solitary spadefoot (*Scaphiopus hurterii*) from Texas, with other herpetological notes. Proc. Biol. Soc. Wash., XXIII, July 23, 1910, pp. 115-122, pls. 1-2.
Eumeces pachyurus is discussed and figured (pl. II, fig. 2).

——— 1915. Reptiles and amphibians of Texas. Baylor Univ. Bull., XVIII, No. 4, 1915, pp. 1-82.
Texas species listed: *Eumeces quinquelineatus, guttulatus, obsoletus, leptogrammus, multivirgatus, pachyurus, tetragrammus, brevilineatus,* and *anthracinus* (pp. 25-28).

——— 1922. An annotated catalogue of amphibians and reptiles of Bexar county, Texas. Bull. Sci. Soc. San Antonio, No. 4, Apr. 1922, pp. 1-21.
Plestiodon brevilineatus and *P. obsoletus* listed.

——— 1924. Notes on the herpetology of Hot Springs, Ark. Baylor Univ. Bull., XXVII, No. 3, 1924, pp. 29-47.
There is a description and discussion of *Plestiodon fasciatus* and a very detailed account of *Plestiodon anthracinus.*

——— 1926. Amphibians and reptiles collected in Somerville county, Texas. Contr. Baylor Univ. Mus., No. 2, 1926, pp. 1-2.
Plestiodon fasciatus listed.

——— 1926*a*. Notes on the herpetology of the east Texas timber belt. Liberty county amphibians and reptiles. Contr. Baylor Univ. Mus., No. 3, 1926, pp. 1-3.
Lists *Plestiodon fasciatus.*

——— 1926*b*. A list of the reptiles and amphibians collected by Louis Garni in the vicinity of Boerne, Texas. Contr. Baylor Univ. Mus., No. 6, 1926, pp. 1-9.
Eumeces brevilineatus listed.

——— 1926*c*. Notes on the herpetology of the east Texas timber belt. No. 2. Henderson county amphibians and reptiles. Contr. Baylor Univ. Mus., No. 7, 1926, pp. 1-11.
Records for *Eumeces fasciatus.*

——— 1927. Observations of the food habits of Texas amphibians and reptiles. Copeia, No. 162, Jan.-Mar. 1927, pp. 6-9.
Notes on the food habits of *Eumeces pachyurus.*

——— 1927*a*. Chapters from the life histories of Texas reptiles and amphibians. Contr. Baylor Univ. Mus., No. 10, 1927, pp. 1-14.
Notes on the enemies of *Eumeces fasciatus.*

——— 1928. Common and English folk names for Texas amphibians and reptiles. Contr. Baylor Univ. Mus., No. 16, Aug. 4, 1928, pp. 1-21.
Common names are given for *Eumeces brevilineatus* and *fasciatus.*

——— 1929. Dragons and other reptiles, real and imaginary. Baylor Univ. Contr. to Folk Lore, No. III, 1929, pp. 1-19, pls. 3-4.
A plate showing an unnamed skink is a photograph of *Eumeces obsoletus.*

——— 1929*a*. Field notes on the herpetology of Wilbarger county, Texas. Contr. Baylor Univ. Mus., No. 19, 1929, pp. 1-9.
Eumeces obsoletus reported.

——— 1929*b*. A preliminary list of the amphibians and reptiles of Tarrant county, Texas. Contr. Baylor Univ. Mus., No. 19, 1929, pp. 10-15.
Lists *Eumeces fasciatus* from Fort Worth.

——— 1930. A catalogue of the amphibians and reptiles of Travis county, Texas. Contr. Baylor Univ. Mus., No. 23, 1930, pp. 1-16.
Eumeces brevilineatus and *E. obsoletus* listed as present. States that *fasciatus* probably occurs.

——— 1933. Collecting at Helotes, Bexar county, Texas. Copeia, 1933, No. 2, July 20, pp. 77-79.
Eumeces brevilineatus mentioned (pp. 78, 79).

STRECKER, JOHN K., and FRIERSON, L. S. 1926. Herpetology of Caddo and DeSoto Parishes, Louisiana. Contr. Baylor Univ. Mus., No. 5, May 15, 1926, pp. 1-8 (unnumbered).
Reports *Eumeces fasciatus* and *anthracinus.* The large red-headed specimen is doubtless *E. laticeps.*

STRECKER, JOHN K., and WILLIAMS, WALTER J. 1927. Herpetological records from the vicinity of San Marcos, Texas, with distributional data on the amphibians and reptiles of the Edwards Plateau region and central Texas. Contr. Baylor Univ. Mus., No. 12, Dec. 1927, pp. 1-16.
E. brevilineatus discussed, and *E. obsoletus* and *E. tetragrammus* listed.

——— 1928. Field notes on the herpetology of Bowie county, Texas. Contr. Baylor Univ. Mus., No. 17, pp. 3-19.
Notes on *Eumeces fasciatus.*

STUART, L. C. 1934. A contribution to the knowledge of the herpetological fauna of El Peten, Guatemala. Occ. Papers Mus. Zoöl. Univ. Mich., No. 292, June 29, 1934, pp. 1-18.
Eumeces schwartzei discussed.

SUMICHRAST, FERDINAND. 1880. Contribution à l'Histoire Naturelle du Mexique I. Notes sur une Collection de Reptiles et de Batraciens de la partie occidentale de l'Isthme de Tehuantepec. Bull. Soc. Zoöl. de France, V. 1880, pp. 162-190.

——— 1884. Enumeración de las especies de reptiles observados en la Parte Meridional de la República Mexicana. La Naturaleza, (1), VI, 1882-1884, pp. 31-45.
Reports *Eumeces lynxe* as common about Orizaba (perhaps *furcirostris*). Lists *E. sumichrasti.*

SUN, T. P. 1926. Notes on the lizards of Nanking. Contr. Biol. Lab. Sci. China, II, pp. 1-10.
Description and habits of *Eumeces chinensis. E. latiscutatus* is listed probably erroneously, also *Plestiodon* (sic) *elegans.*

SURFACE, H. A. 1908. First report on the lizards of Pennsylvania. Zoöl. Bull. Pennsylvania Dept. Agri., V, No. 8, 1908, pp. 234-258, pls. 30-33, figs. 26-28.
Describes *Eumeces anthracinus* and *fasciatus* in considerable detail, with interesting notes on habits.

SVIHLA, ARTHUR, AND SVIHLA, RUTH DOWELL. 1933. Amphibians and reptiles of Whitman county, Washington. Copeia, 1933, No. 3, Oct. 15, pp. 125-128.
Eumeces skiltonianus recorded from the north bank of Snake river.

SWINHOE, R. 1863. A list of the Formosan reptiles; with notes on a few species and some remarks on a fish (Orthagoriscus sp.). Ann. Mag. Nat. Hist., (3), XII, pp. 219-226.
Mabouia chinensis is reported from Tamsuy, Formosa (this is *Eumeces elegans,* according to Boulenger [Cat. Liz.]).

——— 1870. List of the reptiles and batrachians collected in the Island of Hainan (China). Proc. Zoöl. Soc. London, 1870, pp. 239-241.
Eumeces chinensis reported from Hainan, Formosa and the Pescadores Islands.

——— 1870*a*. Notes on the reptiles and batrachians collected in various parts of China. Proc. Zoöl. Soc. London, 1870, pp. 409-412.

TANNER, VASCO M. 1927. Distributional list of the amphibians and reptiles of Utah. Copeia, No. 163, 1927, pp. 54-58.
Reports *Eumeces skiltonianus* from Zion National Park, New Harmony and Cove Fort.

TAYLOR, EDWARD H. 1929. A species of lizard new to the fauna of the United States: *Eumeces callicephalus* Bocourt. Univ. Kans. Sci. Bull., XIX, 1929, pp. 67-69.
The species is reported from the Huachuca mountains in Arizona.

——— 1932. *Eumeces inexpectatus:* a new American lizard of the family Scincidae. Univ. Kans. Sci. Bull., XX, 1932, pp. 251-258, pls. XVII-XVIII.
Gives the type description of *Eumeces inexpectatus,* with the type locality Citrus county, Florida. The form is compared with *E. fasciatus,* and figures of both species are given.

——— 1932*a*. *Eumeces laticeps:* a neglected species of skink. Univ. Kans. Sci. Bull., XX, 1932, pp. 263-272, pls. XIX-XX.
Reëstablishes the name *laticeps* for the large species of skink long regarded as the southern form of *Eumeces fasciatus.*

——— 1933. Two new Mexican skinks of the genus Eumeces. Proc. Biol. Soc. Wash., XLVI, June 30, 1933, pp. 129-138, 2 figs.
Eumeces ochoterenae from Mazatlán, near Chilpancingo, Guerrero, and *E. copei* from near Asunción, Mexico, Mexico, are described as new. Figures of both species are given.

——— 1933*a*. Notes on type specimens of reptiles and amphibians in the "Alfredo Dugès" museum, Guanajuato, Mexico. Copeia, 1933, No. 2, July 20, pp. 97-98.
Eumeces altamirani and *rovirosae* examined (p. 97).

——— 1933*b*. New species of skinks from Mexico. Proc. Biol. Soc. Wash., XLVI, Oct. 26, 1933, pp. 175-183.
The type descriptions of *Eumeces parvulus* from Tepic, Nayarit, Mexico, and *Eumeces parviauriculatus* from Alamos, Sonora, Mexico, appear.

——— 1934. Notes on Chinese reptiles and amphibians. Lingnan Sci. Jour., XIII, No. 2, Apr. 18, 1934, pp. 297-310.
Eumeces chinensis and *elegans* reported from Foochow, China.

——— 1934*a*. A new species of lizard from Mexico. Univ. Kans. Sci. Bull., XXI, No. 5, Mar. 1933 (Sept., 1934), pp. 257-267, pls. 24-25.
Eumeces indubitus described.

——— 1935. A new skink from Mexico. Zoöl. Ser. Field Mus. Nat. Hist., Vol. XX, No. 10, pp. 77-80, fig 7.
Eumeces colimensis is described from Colima, Mexico, with figures of the head scales.

TCHUNG, LIN TCHANG. 1931. Notes on some Chinese lizards. Bull. Fan Memorial Inst. Biol. Peiping, II, 1931, pp. 265-280, pl. 1.
Eumeces latisculatus (sic) and *Eumeces pekinensis* reported from Peiping, and *Eumeces elegans* and *E. chinensis* from Nanking.

TEMMINCK, C. J., and SCHLEGEL, H. 1835-1838. Fauna japonica. Reptilia. pp. i-xxi, 1-144, map, pls. I-IX (Chelonia), I-X (Ophidia), I-VIII (Sauria and Batrachia).
Discusses *Scincus quinquelineatus* (= *Eumeces latiscutatus*) and gives figures of it (Pl. I, figs. 1-4).

TERENTJEV, PAUL V. 1923. Concerning the question of the presence of *Eumeces marginatus* Hall. in Russia. Copeia, No. 119, June 16, 1923, p. 76.
Specimens of skinks from the Ussuri coast of Siberia identified by Elpatjewski and Sabanejew as *Eumeces marginatus* are identified as *E. latiscutatus.*

THEOBALD, WILLIAM. 1866. Catalogue of reptiles in the museums of the Asiatic Society of Bengal. Extra Number, Journ. Asiatic Soc. Bengal, No. CXLVI, 1866, pp. 1-88, pls. 1-4.
Lists *Plestiodon quinquelineatum* (= *Eumeces chinensis*) from China, and *Mabouia quadrilineata* Blyth from Hongkong, probably the type. He states the specimen is labelled "*Plestiodon quinquelineatum* L. North Carolina, Rev. F. Fitzgerald" in Mr. Blyth's handwriting! *Plestiodon scutatus* is also described from a specimen without locality, and *P.* [*lestiodon*] *laticeps* D. & B. is listed from North Carolina.

——— 1876. Descriptive catalogue of the reptiles of British India. Calcutta, Thacker, Spink and Co., 1876, pp. i-x, 1-238, i-xxxviii, i-xiii, pls. 1-2.
Lists and describes *Eumeces taeniolatus* from "hills between Jhilum and Kashmir," and *Eumeces blythianus* from the doubtful locality, Amritsar, Punjab.

THOMINOT, M. A. 1883. Note sur un Reptile d'espèce nouvelle provenant du Mexique et appartenant au genre Eumeces (Plestiodon). Bull. Soc. Philom, Paris, (7), VII, 1882-1883, pp. 138-139.

Eumeces (Plestiodon) dugesii is described as new from a specimen collected by Alfredo Dugès in the state of Guanajuato, Mexico.

THOMPSON, CRYSTAL. 1915. The reptiles and amphibians of Manistee county, Michigan. Occ. Papers Mus. Zoöl. Univ. Mich., No. 18, 1915, pp. 1-6.

Notes on *Eumeces quinquelineatus*.

THOMPSON, J. C. 1912. Herpetological notices No. 2. Prodrome of description of new species of Reptilia and Batrachia from the Far East. Privately printed, June 28, 1912, pp. 1-4.

Eumeces oshimensis is described as new from Kikaigashima, Loo Choo Islands, and *Eumeces stimsonii* from Ishigaki Island, Loo Choo Islands.

——— 1912*a*. Herpetological notices No. 3. On reptiles new to the island ares of Asia. Privately printed, July 31, 1912, pp. 1-5.

Mentions *Eumeces stimsonii*.

TOWNSEND, CHARLES H. 1887. Field notes on the mammals, birds and reptiles of Northern California. Proc. U. S. Nat. Mus., X, 1887, pp. 159-241.

Reports *Eumeces skiltonianus* from Pitt river.

TRISTAM. 1860. The Great Sahara wanderings south of the Atlas mountains. London, 1860. Appendix VI.

Appendix VI includes data on reptiles.

TURNER, CLARENCE L. 1914. Wax reconstruction of the brain of an embryo lizard, Eumeces. Univ. Kans. Sci. Bull., 9, No. 9, pp. 111-118.

UNGER AND KOTSCHY. 1865. Die Insel Cypern. Wien., 1865, 8 vo, pp. 1-572. (Not seen.)

VAN DENBURGH, JOHN. 1895. A review of the herpetology of Lower California. Proc. Calif. Acad. Sci., (2), V, 1895, pp. 77-162, pl. XIII.

The type description of *Eumeces lagunensis* appears, with good figures on pl. XIII, figs. a-f.

——— 1896. A list of some reptiles from southeastern Arizona, with a description of a new species of *Cnemidophorus*. Proc. Calif. Acad. Sci., (2), VI, 1896, pp. 338-349.

Eumeces obsoletus reported from Fort Grant, Graham county, Arizona.

——— 1896*a*. Description of a new lizard (Eumeces gilberti) from the Sierra Nevada of California. Proc. Calif. Acad. Sci., (2), VI, 1896, pp. 350-352.

Type description given of this form from a specimen from Yosemite Valley, Mariposa county, California.

——— 1897. The reptiles of the Pacific Coast and the Great Basin. Occ. Papers Calif. Acad. Sci., V, 1-236.

Careful accounts given of *Eumeces skiltonianus* and *E. gilberti*, with a figure of the former species.

——— 1905. The reptiles and amphibians of the islands of the Pacific Coast of North America from the Farallons to Cape San Lucas and the Revilla Gigedas. Proc. Calif. Acad. Sci., (3), IV, 1905, pp. 1-40.

Reports *Eumeces skiltonianus* from North Coronado Island, Lower California.

——— 1912. Advance diagnoses of new reptiles and amphibians from the Loo Choo Islands and Formosa. Privately printed, July 29, 1912, pp. 1-5.

Describes *Eumeces marginatus amamiensis* from Amami Oshima, *E. ishigakiensis* from Ishigaki Shima, *E. marginatus kikaigensis* from Kikaigo Shima, *E. barbouri* from Amami Oshima, and *E. chinensis formosensis* from Formosa.

——— 1912*a*. Notes on a collection of reptiles from southern California and Arizona. Proc. Calif. Acad. Sci., (4), III, 1912-1913, pp. 147-156.

Eumeces skiltonianus reported from localities in San Diego and San Bernardino counties, California.

——— 1912*b*. Concerning certain species of reptiles and amphibians from China, Japan, the Loo Choo Islands and Formosa. Proc. Calif. Acad. Sci., (4), III, 1912-1913 (Dec., 1912), pp. 187-258.
A very important paper describing in detail *Eumeces barbouri, marginatus amamiensis, marginatus kikaigensis, ishigakiensis* and *chinensis formosensis,* brief descriptions of which had been published in a privately printed paper previously.

——— 1922. The reptiles of western North America. Vol. I, Lizards. Occ. Papers Calif. Acad. Sci., X, 1922, pp. 1-611, pls. 1-57.
Detailed accounts of *Plestiodon skiltonianus, lagunensis, obsoletus* and *guttulatus* [*obsoletus* (part.) = *callicephalus* Bocourt]. *Gilberti* is described and reluctantly placed in the synonymy of *skiltonianus.* Fig. 1, pl. 56, is of *skiltonianus;* fig. 2 is of *gilberti;* pl. 57 is a photograph of *obsoletus.*

——— 1924. Notes on the herpetology of New Mexico, with a list of species from that state. Proc. Calif. Acad. Sci., (4), XIII, No. 12, 1924, pp. 189-230.
Lists *Eumeces multivirgatus* from Fort Wingate and Top of Ridge, Forks of Rio Ruidoso. *E. obsoletus* and *guttulatus* are also listed.

VAN DENBURGH, JOHN, and SLEVIN, JOSEPH. 1913. A list of the amphibians and reptiles of Arizona, with notes on the species in the collection of the Academy. Proc. Calif. Acad. Sci., (4), III, 1913, pp. 391-454, pls. 17-28.
Eumeces obsoletus listed from Arizona.

——— 1914. Reptiles and amphibians of the islands of the west coast of North America. Proc Calif. Acad. Sci., (4), IV, 1914, pp. 129-152.
Reports *Eumeces skiltonianus* from Coronados Islands, Mexico, and from Catalina Is., Cal.

——— 1915. A list of the amphibians and reptiles of Utah, with notes on the species in the collection of the Academy. Proc. Calif. Acad. Sci., (4), V, 1915, pp. 99-110.
Reports *Eumeces skiltonianus* from Mt. Baldy, Beaver county, Utah.

——— 1921. A list of the amphibians and reptiles from Nevada, with notes on the species in the collection of the Academy. Proc. Calif. Acad. Sci., (4) XI, No. 2, July 8, 1921, pp. 27-38.
Lists *Plestiodon skiltonianus.*

——— 1921*a*. List of the amphibians and reptiles of Idaho, with notes on the species in the collections of the Academy. Proc. Calif. Acad. Sci., (4), XI, No. 3, July 8, 1921, pp. 39-47.
First records of *Eumeces skiltonianus* from Idaho: Ft. Hall, Bingham county, and Boise, Ada county.

——— 1921*b*. A list of the amphibians and reptiles of the peninsula of Lower California, with notes on species in the collection of the Academy. Proc. Calif. Acad. Sci., (4), XI, No. 4, July 8, 1921, pp. 49-72.
Lists *Plestiodon skiltonianus* and *P. lagunensis.*

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This work, just off the press, contains a key to eleven of the nineteen forms of *Eumeces* occurring in the territory treated. Certain of his "species" are composite groups of three or four forms. The work will be of little use in identifying many of the species and subspecies occurring in the United States.

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POPE, CLIFFORD H. 1935. The reptiles of China. Nat. Hist. Cent. Asia, X, pp. i-lii, 1-604, pls. I-XXVII, text figs. 1-78.

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EXPLANATION OF PLATES

(543)

PLATE I

Eumeces schwartzei Fischer

Michigan University Museum of Zoölogy, No. 68226; snout to vent, 112 mm.; Chichen-Itzá, Yucatán, Mexico.

PLATE I

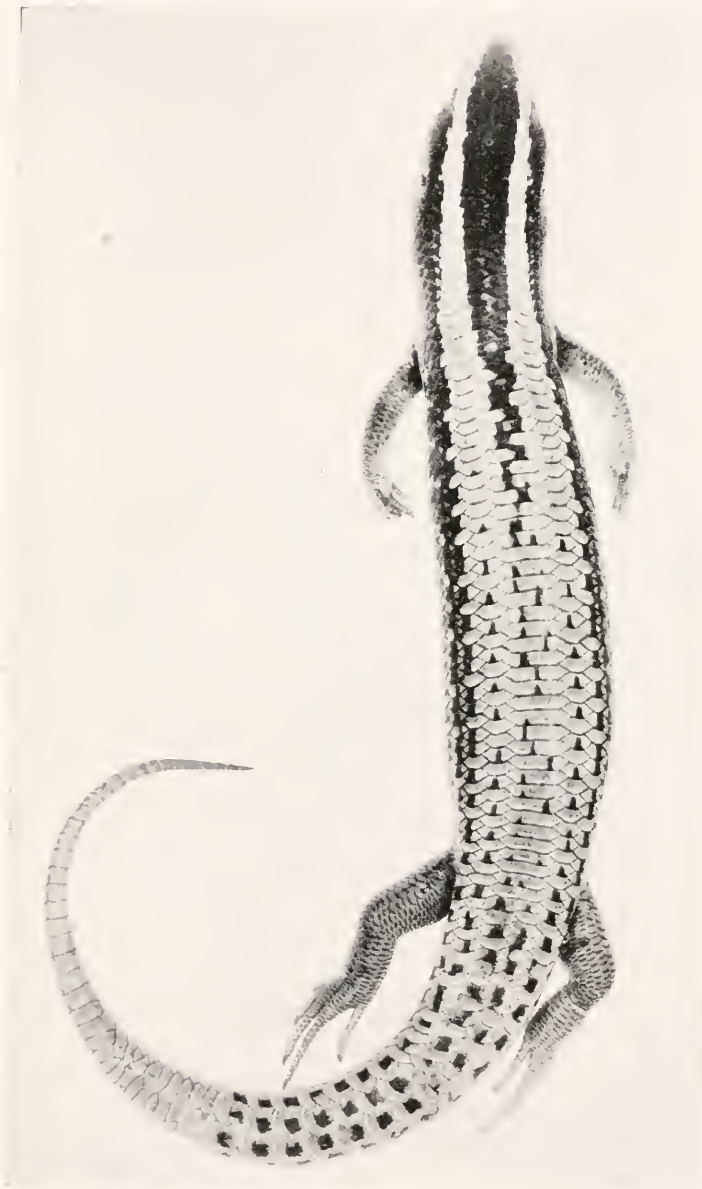


PLATE II

Eumeces altamirani Dugès

FIG. 1. Taken from Dugès (1891), Plate XXII.

Eumeces managuae Dunn

FIG. 2. Photograph of British Museum, No. 53.8.17.6; snout to vent, 116 mm. (*Eumeces taeniolatus* Boulenger, *non* Blyth).

PLATE II

PLATE III

Eumeces taeniolatus (Blyth)

FIG. 1. Lateral view, British Museum, No. 70, 11, 29, 9; Alpine Punjab on the route from Jhelum into Kashmir. Photograph by courtesy of the British Museum (Natural History).

FIG. 2. Same, dorsal view.

Eumeces princeps (Eichwald)

FIG. 3. Kansas University Museum, No. 11020; snout to vent, 125 mm.; Transcaspia.

PLATE III

PLATE IV

Eumeces taeniolatus (Blyth)

FIG. 1. Lateral view, E. H. Taylor Collection, No. 4888; snout to vent, 98.2 mm.; Puli Hatun, Transcaspia.

FIG. 2. Same, dorsal view.

PLATE IV

PLATE V

Eumeces schneiderii (Daudin)

FIG. 1. E. H. Taylor Collection, No. 6521; snout to vent, 160 mm.; "Haiffa" Syria.

Eumeces pavimentatus (Geoffroy Saint-Hillaire)

FIG. 2. Kansas University Museum, No. 11021; snout to vent, 136 mm.; "Haiffa" Syria.

PLATE V

PLATE VI

Eumeces blythianus (Anderson)

FIG. A. Lateral view, British Museum, No. 98.7.12.1; Afridi country, Afghan borderland. Photograph by courtesy of the British Museum (Natural History).

FIG. B. Same, dorsal view.

PLATE VI

PLATE VII

Eumeces algeriensis algeriensis (Peters)

From Boulenger, Trans. Zoöl. Soc. London, XIII, Plate 16. Mogodor, Morocco. (Reduced somewhat.)

PLATE VII

PLATE VIII

Eumeces schneiderii (Daudin)

FIG. 1. United States National Museum, No. 10946; snout to vent, 155 mm.; Algeria.

Eumeces algeriensis algeriensis (Peters)

FIG. 2. Kansas University Museum, No. 11019; snout to vent, 173 mm.; Casablanca, Morocco.

FIG. 3. United States National Museum, No. 37290; snout to vent, 180 mm.; Oran, West Algeria.

PLATE VIII

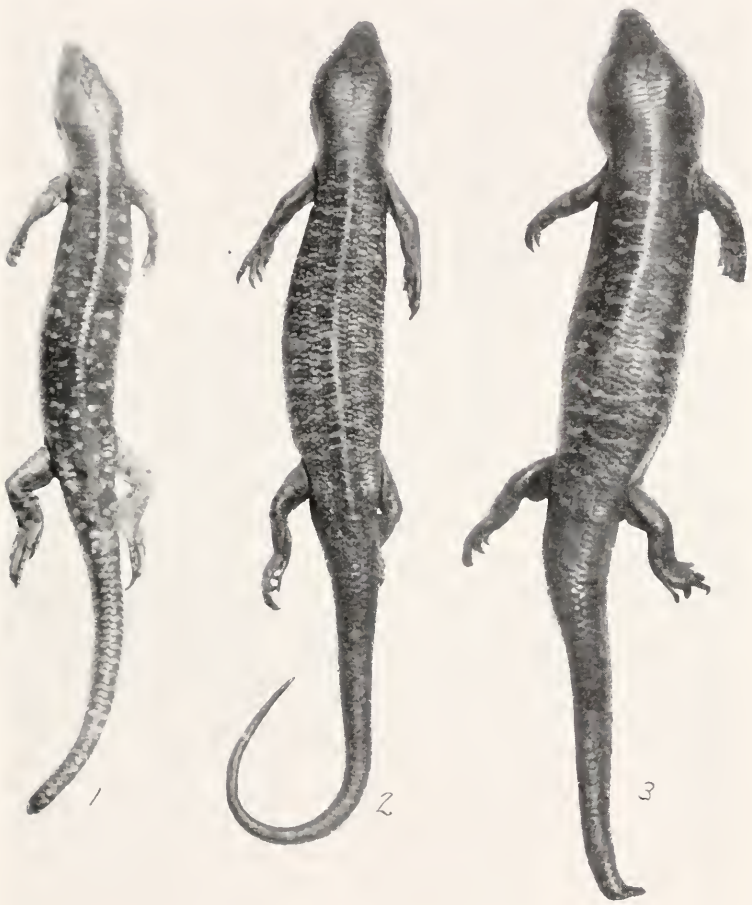


PLATE IX

Eumeces longirostris (Cope)

FIG. 1. Kansas University Museum, No. 8215; snout to vent, 60 mm.; Castle Island, Bermuda Islands.

FIG. 2. Kansas University Museum, No. 8216; snout to vent, 79 mm.; adult male; Castle Island, Bermuda Islands.

FIG. 3. Kansas University Museum, No. 7280; snout to vent, 72 mm.; Castle Island, Bermuda Islands.

PLATE IX

PLATE X

Eumeces sumichrasti (Cope)

FIG. 1. Lateral view, British Museum, No. 81, 10, 31, 30; about natural size; Jalapa, Vera Cruz, Mexico. Photograph by courtesy of the British Museum (Natural History).

FIG. 2. Same, dorsal view.

FIG. 3. Paratype of "*Eumeces schmidti*" Dunn. Field Museum Natural History, No. 18004; snout to vent, 64 mm.; Lancetilla, Honduras.

PLATE X

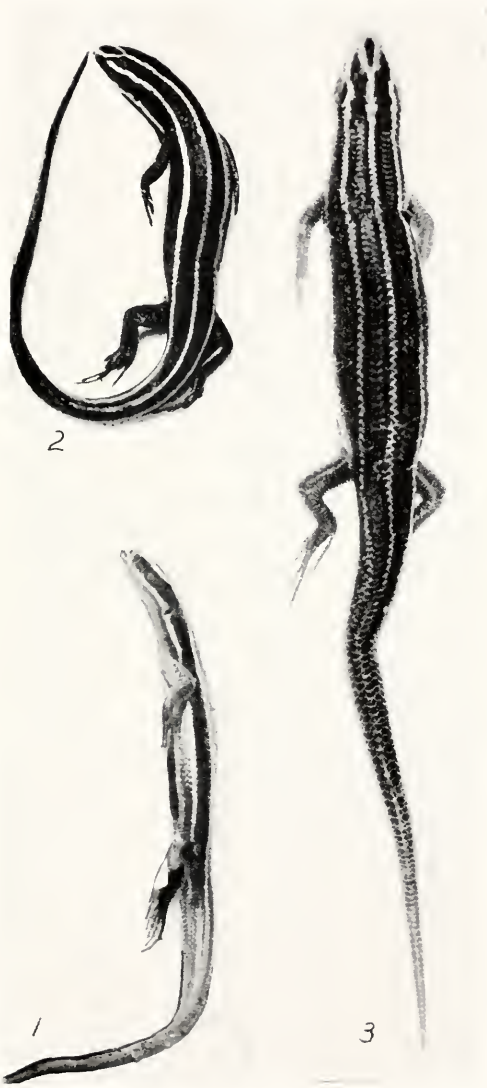


PLATE XI

Eumeces fasciatus (Linnaeus)

FIG. 1. Kansas University Museum, No. 11359; adult male, about natural size; Imboden, Ark.

FIG. 2. Kansas University Museum, No. 11355; about natural size; transitional coloration; Imboden, Ark.

FIG. 3. Kansas University Museum, No. 11352; actual size; Imboden, Ark.

PLATE XI

PLATE XII

Eumeces laticeps (Schneider)

FIG. 1. Michigan University Museum of Zoölogy, No. 67792; snout to vent, 93 mm.; adult female; Pigeon river, Butte county, Alabama.

FIG. 2. Michigan University Museum of Zoölogy, No. 67793; snout to vent, 87 mm.; Houston county, Georgia.

PLATE XII

PLATE XIII

Eumeces laticeps (Schneider)

FIG. 1. Michigan University Museum of Zoölogy, No. 57717; snout to vent, 54 mm.; seven-lined form; Micanopy Road, Florida.

FIG. 2. Michigan University Museum of Zoölogy, No. 56607; snout to vent, 95 mm.; seven-lined form; female with 14 undeveloped eggs in ovaries; Alachua county, Florida.

FIG. 3. Michigan University Museum of Zoölogy, No. 56686; snout to vent, 84 mm.; five-lined form; Hanover, Ind.

FIG. 4. Oklahoma University Museum, No. 7265; snout to vent, 112; five-lined form; Delaware county, Oklahoma.

PLATE XIII

PLATE XIV

Eumeces inexpectatus Taylor

FIG. 1. Lateral view, Michigan University Museum of Zoölogy, No. 61629; female; snout to vent, 67 mm.; Gulfport, Pinelas county, Florida.

FIG. 2. Same, dorsal view.

FIG. 3. Michigan University Museum of Zoölogy, No. 61631; snout to vent, 50 mm.; Hillsboro county, Florida.

FIG. 4. Kansas University Museum, No. 8232; type; snout to vent, 66 mm.; Citrus county, Florida.

FIG. 5. Kansas University Museum, No. 8233; paratype; snout to vent, 62 mm.; Citrus county, Florida.

PLATE XIV

PLATE XV

Eumeces xanthi Günther

FIGS. 1, 2, 3. Dorsal and lateral view of British Museum, No. 89.6.25.4; cotypes; about natural size. Photographs by courtesy of the British Museum (Natural History).

PLATE XV

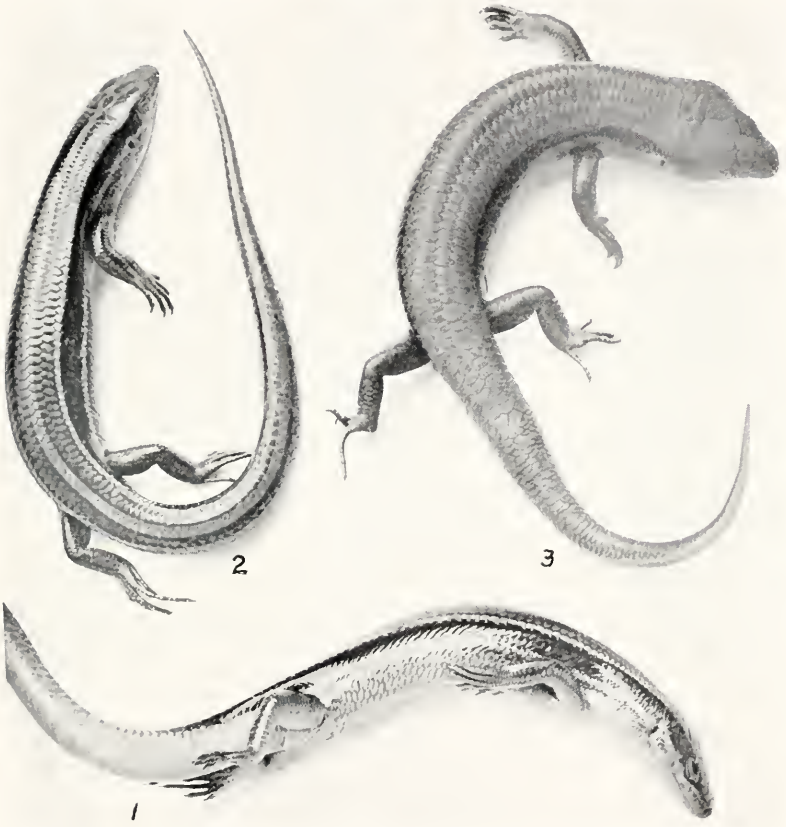


PLATE XVI

Eumeces elegans Boulenger

FIG. 1. California Academy of Sciences, No. 31402; snout to vent, 69 mm.; Moh Kan Shan, China.

FIG. 2. California Academy of Sciences, No. 31399; Moh Kan Shan, China. (The head scales of this specimen are shown in text figure No. 4, A and B.)

FIG. 3. California Academy of Sciences, No. 26762; snout to vent, 89 mm.; Moh Kan Shan, China.

PLATE XVI

PLATE XVII

Eumeces stimsonii Thompson

FIG. 1. California Academy of Sciences, No. 21658; snout to vent, 63 mm.; Ishigakijima, Riu Kiu Islands, Japan.

FIG. 2. California Academy of Sciences, No. 21659; snout to vent, 55 mm.; Ishigakijima, Riu Kiu Islands, Japan.

FIG. 3. California Academy of Sciences, No. 21670; snout to vent, 60 mm.; Ishigakijima, Riu Kiu Islands, Japan.

FIG. 4. California Academy of Sciences, No. 21648; snout to vent, 53 mm.; Ishigakijima, Riu Kiu Islands, Japan.

PLATE XVII

PLATE XVIII

Eumeces marginatus (Hallowell)

FIG. 1. California Academy of Sciences, No. 24252; snout to vent, 53 mm.; Nago, Okinawa, Riu Kiu Islands, Japan.

FIG. 2. California Academy of Sciences, No. 24254; snout to vent, 70 mm.; Nago, Okinawa, Riu Kiu Islands, Japan.

FIG. 3. California Academy of Sciences, No. 24251; snout to vent, 72 mm.; male; Nago, Okinawa, Riu Kiu Islands, Japan.

PLATE XVIII

PLATE XIX

Eumeces okadae (Stejneger)

FIG. 1. United States National Museum, No. 23895; snout to vent, 79 mm.; female; Niishima, Idzu Islands, Japan.

FIG. 2. United States National Museum, No. 23896; snout to vent, 41 mm.; Niishima, Idzu Islands, Japan.

Eumeces oshimensis Thompson

FIG. 3. California Academy of Sciences, No. 21595; Amamioshima, Riu Kiu Islands, Japan.

PLATE XIX

PLATE XX

Eumeces oshimensis Thompson

FIG. 1. California Academy of Sciences, No. 21634; snout to vent, 65.5 mm.; Kikaigashima, Riu Kiu Islands, Japan.

FIG. 2. California Academy of Sciences, No. 21626; snout to vent, 82.5 mm.; Kikaigashima, Riu Kiu Islands, Japan.

FIG. 3. California Academy of Sciences, No. 21613; snout to vent, 66 mm.; Amamioshima, Riu Kiu Islands, Japan.

FIG. 4. California Academy of Sciences, No. 21565; snout to vent, 78 mm.; Amamioshima, Riu Kiu Islands, Japan.

FIG. 5. California Academy of Sciences, No. 21633; snout to vent, 53 mm.; Kikaigashima, Riu Kiu Islands, Japan.

PLATE XX

PLATE XXI

Eumeces latiscutatus (Hallowell)

FIG. 1. California Academy of Sciences, No. 33028; snout to vent, 72.5 mm.; Kobe, Japan.

FIG. 2. California Academy of Sciences, No. 33048; snout to vent, 74.5 mm.; Miyazo, Japan.

FIG. 3. California Academy of Sciences, No. 33049, snout to vent, 72 mm.; Miyazo, Japan.

PLATE XXI

PLATE XXII

Eumeces brevilineatus Cope

FIG. 1. Kansas University Museum, No. 7769; snout to vent, 51 mm.; topotype; Helotes, Bexar county, Texas.

FIG. 2. Kansas University Museum, No. 13199; snout to vent, 49 mm.; Glass Mountains, Brewster county, Texas.

FIG. 3. Kansas University Museum, No. 13200; snout to vent, 58 mm.; Chisos Mountains, Brewster county, Texas.

FIG. 4. Kansas University Museum, No. 7768; snout to vent, 59 mm.; Alpine, Brewster county, Texas.

PLATE XXII

PLATE XXIII

Eumeces callicephalus Bocourt

FIG. 1. Lateral view, Harvard Museum of Comparative Zoölogy, No. 15928; snout to vent, 57 mm.; Chihuahua (City?), Chihuahua, Mexico.

FIG. 2. Same, dorsal view.

FIG. 3. Lateral view; California Academy of Sciences, No. 48095; snout to vent, 52.2 mm.; Huachuca Mountains, Arizona.

FIG. 4. Same, dorsal view.

PLATE XXIII

PLATE XXIV

Eumeces obsoletus (Baird and Girard)

FIG. 1. E. H. Taylor Collection, No. 1886; snout to vent, 94 mm.; Lawrence, Kan.

FIG. 2. Kansas University Museum, No. 7775; snout to vent, 90 mm.; Cameron county, Texas.

FIG. 3. E. H. Taylor Collection, No. 1887; snout to vent, 97 mm.; Lawrence, Kan.

PLATE XXIV

PLATE XXV

Eumeces chinensis pulcher (Duméril and Bibron)

FIG. 1. California Academy of Sciences, No. 14662; Shanghai, China.

Eumeces chinensis chinensis (Gray)

FIG. 2. Michigan University Museum of Zoölogy, No. 65028; snout to vent, 92 mm.; Moh Kan Shan, China.

FIG. 3. California Academy of Sciences, No. 18603; Keelung, Formosa. ("*Eumeces chinensis formosanus*" Van Denburgh.)

PLATE XXV

PLATE XXVI

Eumeces kishinouyei Stejneger

FIG. 1. California Academy of Sciences, No. 21724; snout to vent, 80 mm.; Ishigakijima, Riu Kiu Islands, Japan.

FIG. 2. California Academy of Sciences, No. 21722; snout to vent, 134 mm.; Miyakojima, Riu Kiu Islands, Japan.

FIG. 3. California Academy of Sciences, No. 21725; snout to vent, 137.5 mm.; Ishigakijima, Riu Kiu Islands, Japan.

PLATE XXVI

PLATE XXVII

Eumeces multivirgatus (Hallowell)

FIG. 1. Denver Museum, No. 6; snout to vent, 60 mm.; Weld county, Colorado.

FIG. 2. Denver Museum, No. 3; snout to vent, 57 mm.; Weld county, Colorado.

FIG. 3. Denver Museum, No. 8; snout to vent, 63 mm.; Weld county, Colorado.

PLATE XXVII

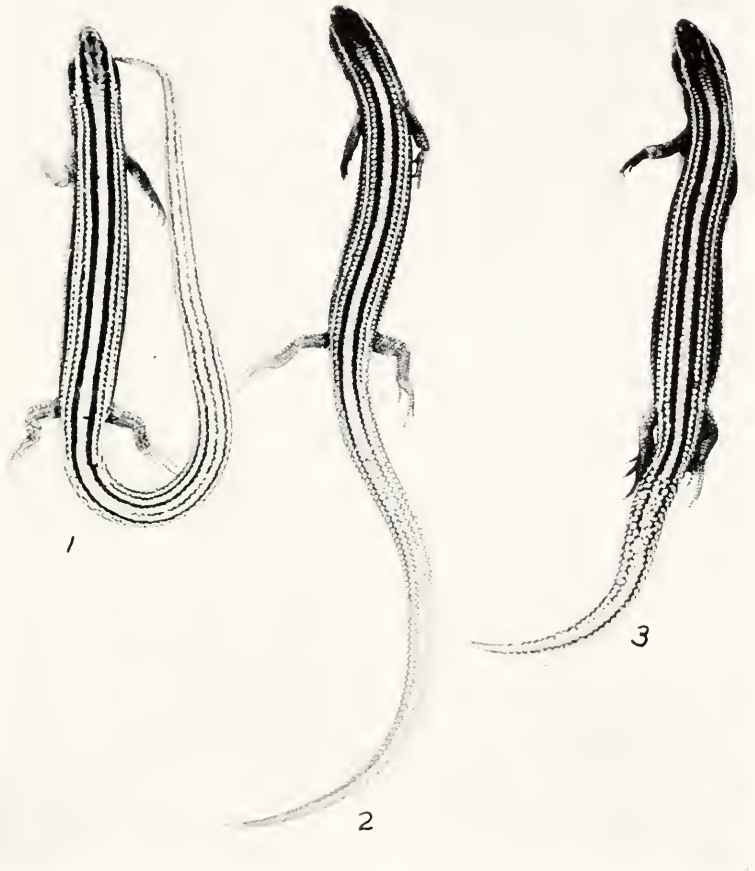


PLATE XXVIII

Eumeces septentrionalis obtusirostris (Bocourt)

FIG. 1. Kansas University Museum, No. 13158; snout to vent, 63 mm.; Waco, McLennan county, Texas.

FIG. 2. Kansas University Museum, No. 13159; snout to vent, 45 mm.; Waco, McLennan county, Texas.

Eumeces multivirgatus Hallowell

FIG. 3. United States National Museum, No. 30833; snout to vent, 69 mm.; Chihuahua, Chihuahua, Mexico.

FIG. 4. Collection Grand Cañon National Park, unnumbered; young; snout to vent, 35 mm.; Grand Cañon National Park, Arizona.

PLATE XXVIII

PLATE XXX

Eumeces humilis Boulenger

FIG. 1. Lateral view, Kansas University Museum, No. 13161; snout to vent, 47 mm.; two miles south of entrance of Carlsbad Caverns, New Mexico.

FIG. 2. Same, dorsal view.

FIG. 3. Michigan University Museum of Zoölogy, No. 70516; snout to vent, 65 mm.; Guadalupe Mountains, Culberson county, Texas.

PLATE XXX

PLATE XXXI

Eumeces egregius onocrepis (Cope)

FIG. 1. United States National Museum, No. 60515; snout to vent, 54 mm.; Auburndale, Pope county, Florida.

Eumeces egregius egregius (Baird)

FIG. 2. United States National Museum, No. 61692; snout to vent, 46 mm.; Big Pine Key, Florida.

Eumeces parvulus Taylor

FIG. 3. United States National Museum, No. 51395; paratype; snout to vent, 37 mm.; Miniman, Nayarit, Mexico.

FIG. 4. United States National Museum, No. 56903; snout to vent, 51 mm.; type; Tepic, Nayarit, Mexico.

Eumeces parviauriculatus Taylor

FIG. 5. United States National Museum, No. 47536, snout to vent, 47 mm.; Alamos, Sonora, Mexico.

PLATE XXXI

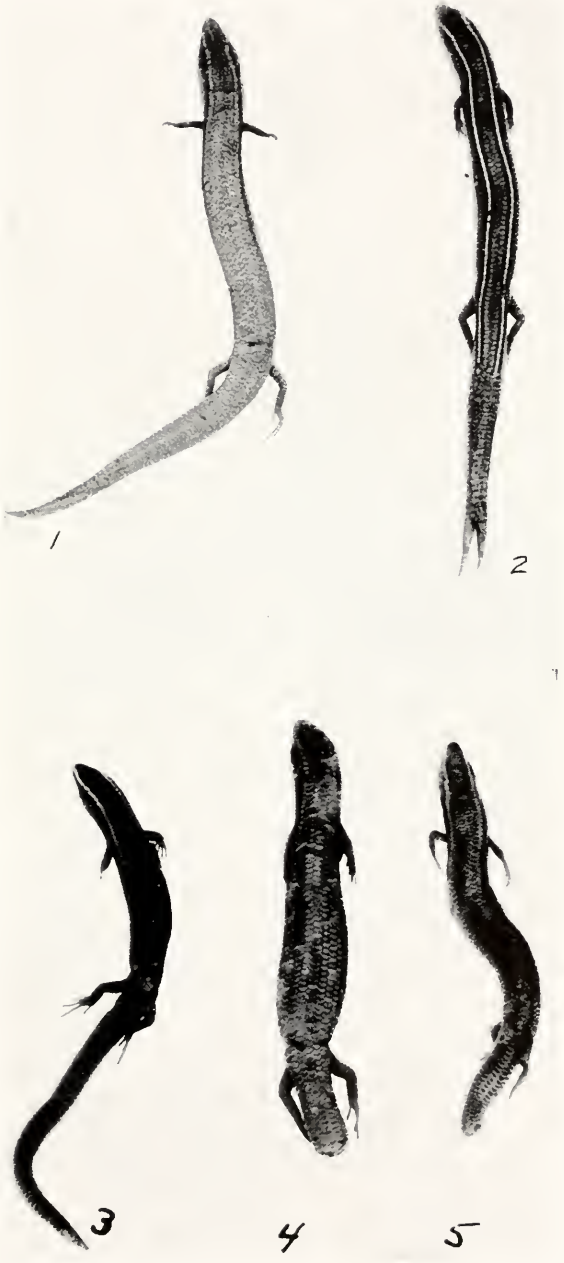


PLATE XXXII

Eumeces anthracinus (Baird)

FIG. 1. Kansas University Museum, No. 11342, snout to vent, 56 mm.; Cherokee county, Kansas.

FIG. 2. Kansas University Museum, No. 8219; snout to vent, 56 mm.; Imboden, Lawrence county, Arkansas.

FIG. 3. Kansas University Museum, No. 8221; snout to vent, 56 mm.; Imboden, Lawrence county, Arkansas.

FIG. 4. Kansas University Museum, No. 11339; actual size; Galena, Cherokee county, Kansas.

FIG. 5. Kansas University Museum, No. 11340; actual size; Galena, Cherokee county, Kansas.

PLATE XXXII

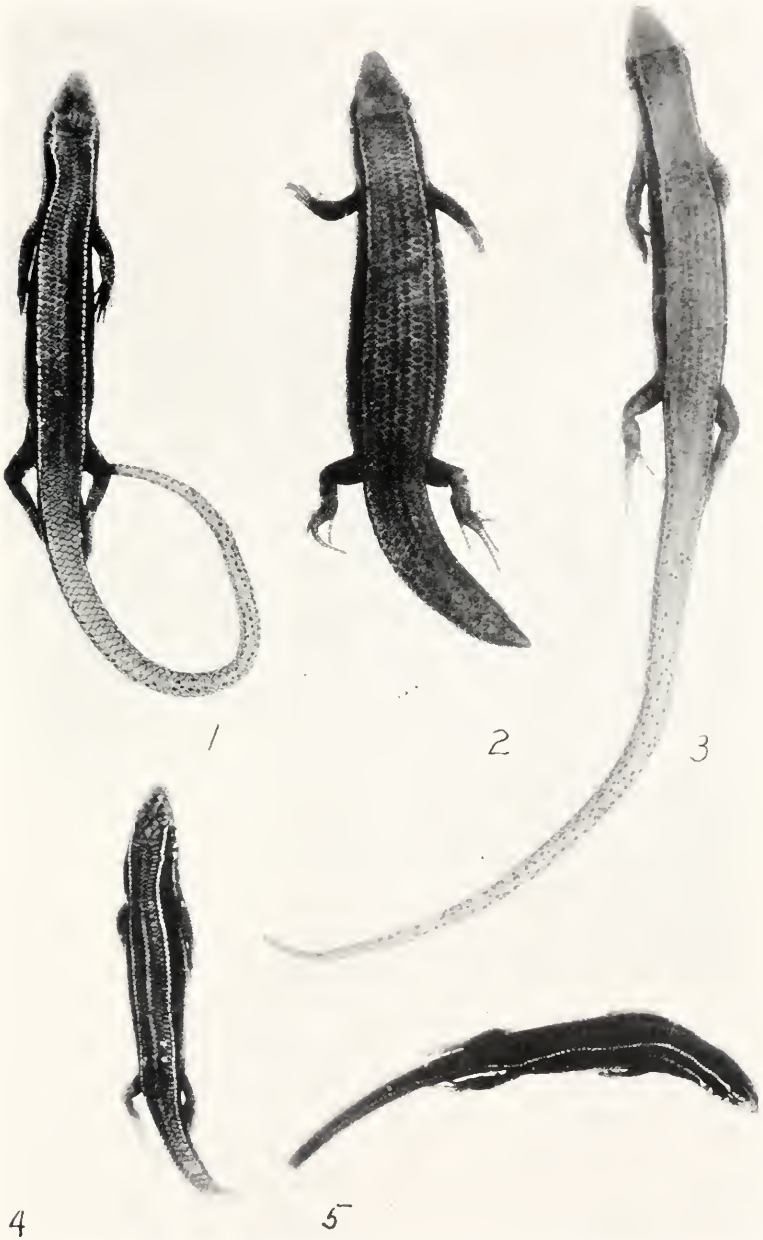


PLATE XXXIII

Eumeces copei Taylor

FIG. 1. United States National Museum, No. 32291; snout to vent, 70 mm.; "Either the valley of Mexico, or the neighboring one of Toluca" (Distrito Federal or Mexico, Mexico).

FIG. 2. E. H. Taylor and Hobart M. Smith Collection, No. 3865; snout to vent, 62 mm.; 10 miles southeast of Asunción, Western México, Mexico.

FIG. 3. E. H. Taylor and Hobart M. Smith, No. 3859; snout to vent, 76 mm.; 10 miles southeast of Asunción, Western México, Mexico.

PLATE XXXIII

PLATE XXXIV

Eumeces septentrionalis septentrionalis (Baird)

FIG. 1. Kansas University Museum, No. 6982; snout to vent, 74 mm.; Onaga, Pottawatomie county, Kansas.

FIG. 2. Kansas University Museum, No. 6979; snout to vent, 65 mm.; Onaga, Pottawatomie county, Kansas.

FIG. 3. Kansas University Museum, No. 6991; snout to vent, 68 mm.; Onaga, Pottawatomie county, Kansas.

PLATE XXXIV

PLATE XXXV

Eumeces skiltonianus skiltonianus (Baird and Girard)

FIG. 1. Lateral view, California Academy of Sciences, No. 48923; snout to vent, 40 mm.; Carmel, Monterey county, California.

FIG. 2. Same, dorsal view.

FIG. 3. California Academy of Sciences, No. 39330; snout to vent, 65 mm.; Comptche, Mendocino county, California.

FIG. 4. California Academy of Sciences, No. 26986; snout to vent, 67 mm.; Carmel, Monterey county, California.

PLATE XXXV

PLATE XXXVI

Eumeces lagunensis Van Denburgh

FIG. 1. University of California, Museum of Vertebrate Zoölogy, No. 13760; snout to vent, 50 mm.; Comondú, 1,000 feet, Baja California, Mexico.

Eumeces skiltonianus skiltonianus (Baird and Girard)

FIG. 2. California University Museum of Vertebrate Zoölogy; snout to vent, 65 mm.; typical specimen; Todos Santos Islands, Baja California, Mexico.

FIG. 3. California Academy of Sciences, No. 13736; snout to vent, 65 mm.; male; Carmel, Monterey county, California.

FIG. 4. California University Museum of Vertebrate Zoölogy, No. 10950; snout to vent, 61 mm.; Turner's, Lyonsville, Tehuma county, California. (A single atypical specimen obtained in a large series of typical ones.)

PLATE XXXVI

PLATE XXXVII

Eumeces gilberti gilberti Van Denburgh

FIG. 1. California Academy of Sciences, No. 65307, snout to vent, 75 mm.; Panamint Mountains, Inyo county, California.

FIG. 2. California University Museum of Vertebrate Zoölogy, Yosemite Valley, Mariposa county, California.

FIG. 3. California Academy of Sciences, No. 50158, snout to vent, 96 mm.; Yosemite Valley, Mariposa county, California.

PLATE XXXVII

PLATE XXXVIII

Eumeces gilberti gilberti Van Denburgh

FIG. 1. Stanford University Museum, No. 3421; approximately natural size; San Joaquin county, California.

FIG. 2. Stanford University Museum, No. 3422; approximately natural size; San Joaquin county, California.

FIG. 3. California University Museum of Vertebrate Zoölogy, No. 3985; snout to vent, 89 mm.; Carbondale, Amador county, California.

FIG. 4. California University Museum of Vertebrate Zoölogy, No. 3559; snout to vent, 98 mm.; San Joaquin county, California.

PLATE XXXVIII

PLATE XXXIX

Eumeces gilberti rubicaudatus subsp. nov.

FIG. 1. California Academy of Sciences, No. 39001; snout to vent, 51 mm.; Tehachapi Mountains, Kern county, California.

FIG. 2. California Academy of Sciences, No. 35363, snout to vent, 39.5 mm.; Witch Creek, San Diego county, California.

FIG. 3. California University Museum of Vertebrate Zoölogy, No. 5560; snout to vent, 87 mm.; near Fort Tejon, Kern county, California.

FIG. 4. California Academy of Sciences, No. 40301; male; snout to vent, 101 mm.; Campo, San Diego county, California.

PLATE XXXIX

PLATE XL

Eumeces quadrilineatus (Blyth)

FIG. 1. American Museum of Natural History, No. 30197; male; snout to vent, 73 mm.; South Mountains, Nodoa, Hainan, China.

Eumeces lynxe lynxe Wiegmann

FIG. 2. Michigan University Museum of Zoölogy, No. 48066; female; snout to vent, 67 mm.; Guerrero, Hidalgo, Mexico.

Eumeces colimensis Taylor

FIG. 3. Field Museum of Natural History, No. 1649; type; female; snout to vent, 65 mm.; Colima, Colima, Mexico.

Eumeces lynxe lynxe Wiegmann

FIG. 4. United States National Museum, No. 14605; female; snout to vent, 62 mm.; "Mexico."

PLATE XL

PLATE XLI

Eumeces brevirostris (Günther)

FIG. 1. E. H. Taylor and Hobart M. Smith Collection, No. 2587; snout to vent, 54 mm.; Totalco, Vera Cruz, Mexico.

FIG. 2. E. H. Taylor and Hobart M. Smith Collection, No. 2571; snout to vent, 54 mm.; Totalco, Vera Cruz, Mexico.

FIG. 3. United States National Museum, No. 46682; snout to vent, 64 mm.; La Parada, Oaxaca, Mexico.

PLATE XLI

PLATE XLII

Eumeces indubitus Taylor

FIG. A. E. H. Taylor and Hobart M. Smith Collection, No. 1674; paratype; about actual size; forty miles south of Mexico City, Distrito Federal, Mexico.

FIG. B. E. H. Taylor and Hobart M. Smith Collection, No. 1731; type; about actual size; forty miles south of Mexico City, Distrito Federal, Mexico.

PLATE XLII

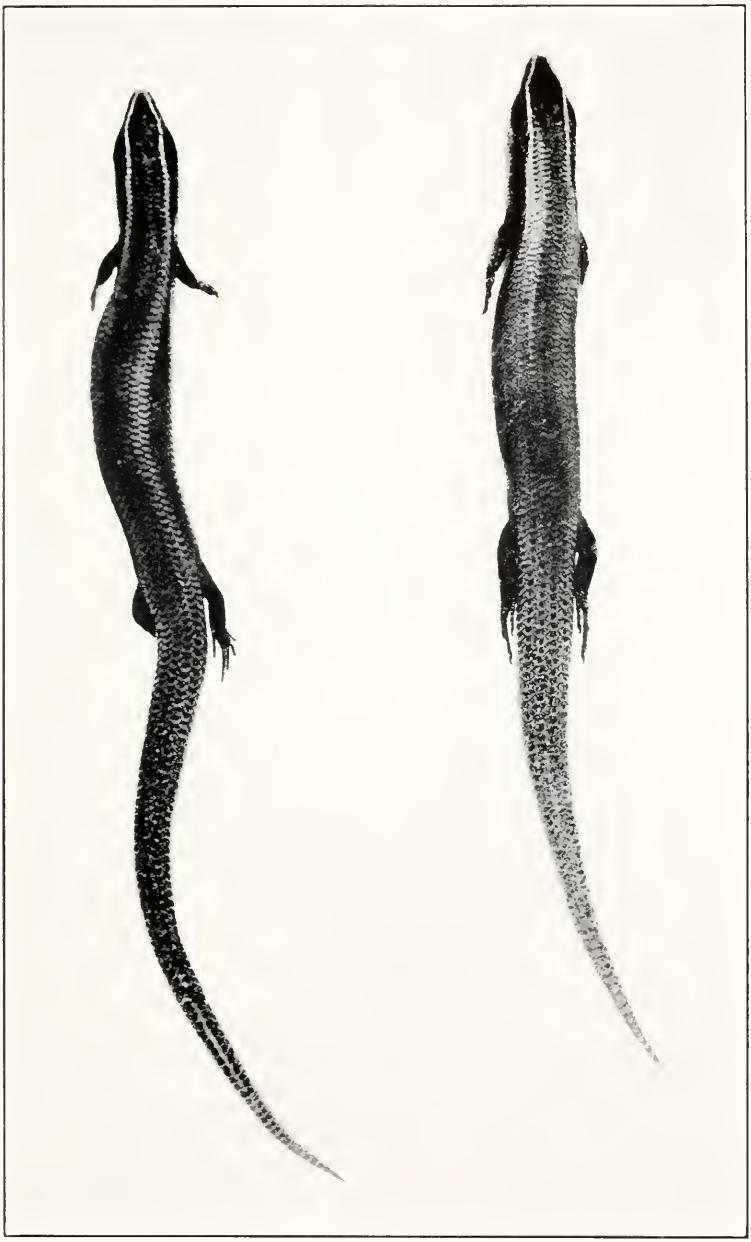


Fig. A. Fig. B.

PLATE XLIII

Eumeces ochoterenae Taylor

FIG. 1. E. H. Taylor and Hobart M. Smith Collection, No. 1481; snout to vent, 53 mm.; Mazatlán, Guerrero, Mexico.

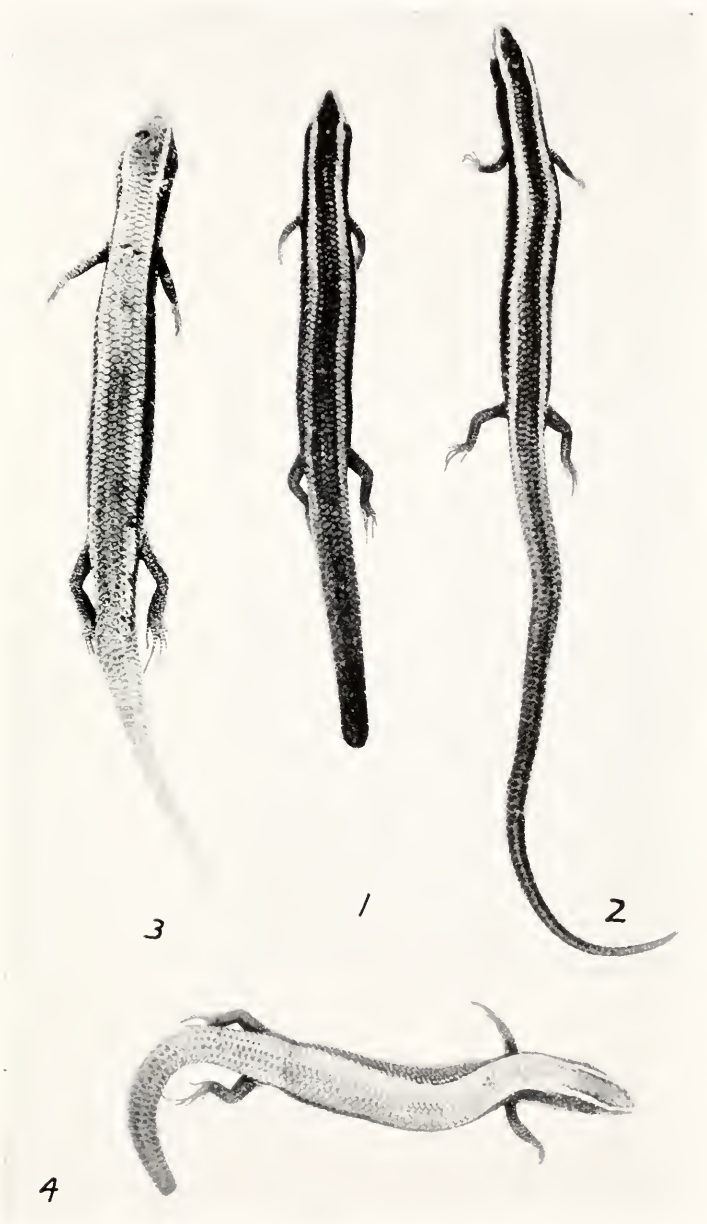
FIG. 2. E. H. Taylor and Hobart M. Smith Collection, No. 1015; snout to vent, 56 mm.; Mazatlán, Guerrero, Mexico.

Eumeces dugesii Thominot

FIG. 3. United States National Museum, No. 26153; snout to vent, 58.6 mm.; Guanajuato, Guanajuato, Mexico.

FIG. 4. United States National Museum, No. 26154; snout to vent, 67 mm.; Guanajuato, Guanajuato, Mexico.

PLATE XLIII



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